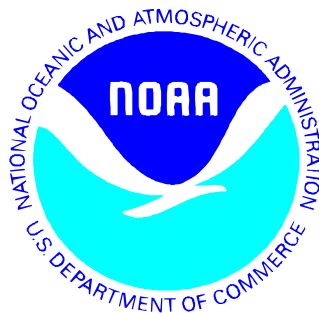


Coastal Hazards Information System COHIS



NOAA Coastal Programs Division

Table of Contents

Introduction	1
Summary of Project Phases	2
GPS Pathfinder Office	3
Data Dictionary/Creating a Data Dictionary	4-7
Data Transfer (PC to GeoExplorer® 3)	8-9
Data Collecting	10-13
Downloading (GeoExplorer® 3 to PC)	14-16
Data Correction	17-22
Data Export (Creating Shapefiles)	23-25
ArcView® GIS	26-39
Damage Assessment	40-45

Preface

Coastal Hazards Information System COHIS

A cooperative project between the National Oceanic and Atmospheric Administration, Coastal Programs Division and Georgia Department of Natural Resources - Coastal Resources Division, and Alabama Coastal Management Program

With Assistance from: NOAA, Office of Response and Restoration; NOAA, National Geodetic Survey; Federal Emergency Management Agency; South Carolina Office of Ocean and Coastal Resource Management; Georgia Emergency Management Agency; Savannah Area GIS; Glynn County, GA, Alabama Department of Environmental Conservation, Alabama Department of Environmental Management, Baldwin County, AL, and Mobile County, AL

Special Thanks to:

Dave Rigney (NGS) for technical assistance on this project and development of this User Manual through NOAA's Rotational Assignment Program

The National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service (NOS) has entered into an agreement with the Federal Emergency Management Agency (FEMA) to provide hurricane response and recovery assistance to four pilot project states - Georgia, Alabama, North Carolina and Mississippi. In an effort to provide greater emergency preparedness and response capability, NOAA's Coastal Programs Division developed this prototype Coastal Hazards Information System (COHIS) for the states of Georgia and Alabama. The goal of this project is to provide a tool that can be used by other states in disaster planning and response through the combined application of a Geographic Information System (GIS), Global Positioning System (GPS), and ArcIMS® Internet Mapping. This User Manual, as well as an internet-based version of the project, will provide the necessary tools and information to implement this system in other states.

This joint initiative between NOAA, FEMA, and the federally approved Coastal Management Programs will advance NOAA's and the state's ability to respond to a hurricane disaster. COHIS will provide a unified and comprehensive pre-storm planning and damage assessment capability for the state. Damage assessment crews will have the capability to rapidly and accurately map damaged areas and share this information with FEMA, NOAA, state emergency management agencies, the counties, and the public through an internet-based GIS mapping system. The FEMA Disaster Field Office (DFO) will thus be able to communicate its latest damage assessments in real-time. Experience from previous disasters has shown that this type of system is essential if immediate assessment of damage property is to be provided. Delays in determining the location, ownership, and status of damaged properties can create unnecessary financial and emotional hardships, and prevent emergency funds from reaching the people most affected by the storm.

COHIS is an ArcView-based system modeled after South Carolina's Office of Ocean and Coastal Resource Management's "Post Hurricane Recovery Project." South Carolina OCRM's project was developed through a partnership with NOAA's Coastal Services Center - Coastal Management Fellowship, and SC Sea Grant Consortium. The COHIS project includes a digital orthophoto basemap, digitized parcel data, ownership information, and a GPS referenced photographic inventory of all shoreline structures. By acquiring this information and packaging it in an ArcView project in advance of a major storm, the process of performing damage assessment following a storm will be greatly enhanced.

This manual is designed to guide the user in collecting pre and post-storm inventory data. This manual describes the use of: Trimble® GPS Pathfinder Office® software; GPS data collection using the Trimble® GeoExplorer® 3; and ArcView® GIS software; as they apply to COHIS.

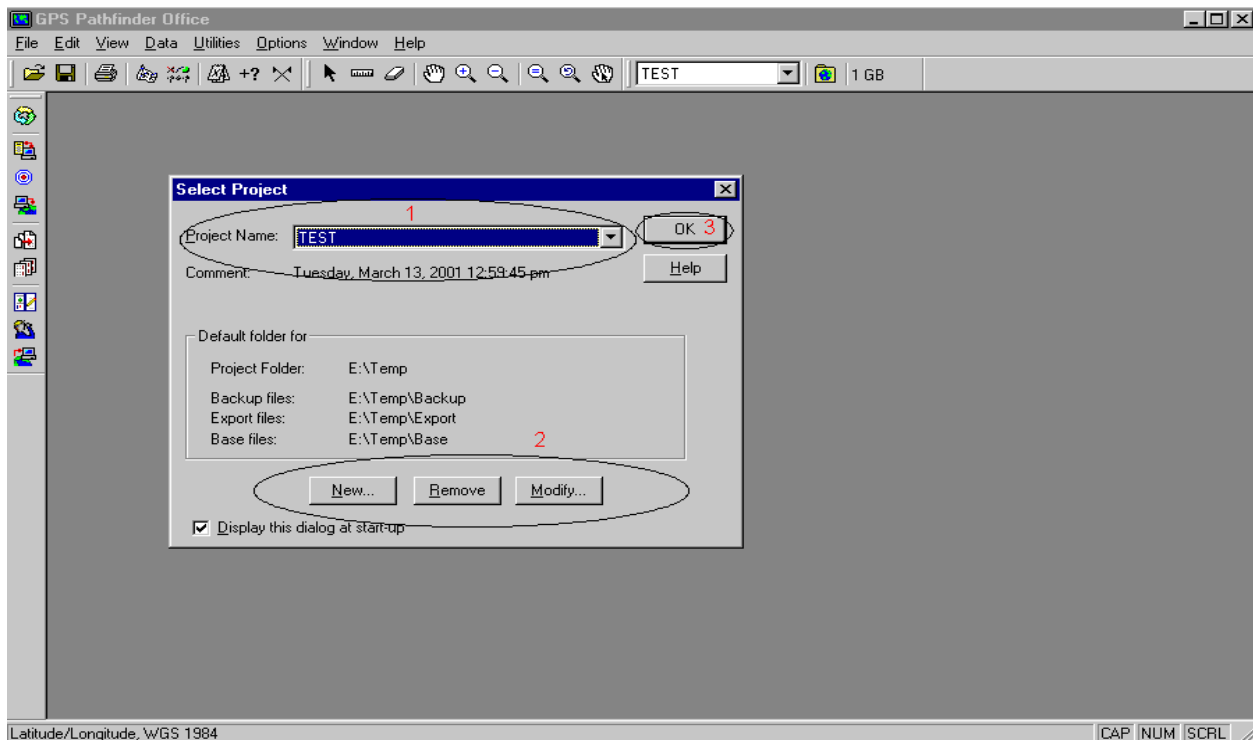
1) Data Collection - During this phase, georeferenced latitude and longitude coordinates of all houses and structures was collected using Trimble GeoExplorer 3 Global Position System (GPS). Pathfinder Office software was used to set up data dictionaries for ease of data collection on the Trimble GPS units. Digital photos were taken of the front and back of all properties surveyed. The focus of the areas that need to be inventoried will be site and state-specific. In the case of Georgia and Alabama, a decision was made to inventory only the first row of houses, condominiums, hotels, and other structures along the exposed, ocean or Gulf-facing shorelines that are at greatest risk of sustaining hurricane damage. These are areas that are under the direct jurisdiction of the state coastal management program and will require coastal permits for repair or rebuilding following damage incurred by storms or hurricanes. Additional data that was acquired, and is essential for completion of the project, is the parcel and cadastral (ownership) information for each of the properties surveyed.

2) Downloading, Correcting and Exporting Data - After field data is collected on the GPS units, the data needs to be post-processed (corrected) to achieve the highest degree of accuracy. The data then needs to be exported in Arcview shapefile format. Pathfinder Office software is used to complete this step and details are outlined in the manual.

3) Importing the Data into Arcview - The COHIS project is designed to be run in an Arcview format. Once the data is corrected and exported from Pathfinder Office in shapefile format, it needs to be imported into Arcview. Additional data that are helpful, but not absolutely necessary to have, include the digital shoreline, roads, and orthophotography. The orthophotography for Georgia and Alabama were obtained from the states, counties, and NOAA's National Geodetic Survey office. When used as a basemap, the orthophotography is extremely helpful for orientation and in confirming the precise location of surveyed structures. Digital photos of the inventoried structures are hotlinked to the GPS coordinates collected, and to the cadastral data. This is described in detail beginning with the section Arcview GIS.

4) Preparing for the Damage Assessment Phase - The ultimate aim of the COHIS project is to expedite the damage response phase following a severe storm or hurricane. By creating a detailed inventory of houses most likely to sustain damage, including gathering the necessary ownership information, the state will be prepared to quickly map damaged areas and begin the permitting process to allow repair and rebuilding of damaged properties to begin. GPS units are to be utilized during this phase to collect latitude and longitude coordinates of damaged homes and to make the initial damage assessment. State permitting guidelines will vary depending on the amount of damage sustained by a structure (in percent of total appraised value). In Georgia, for instance, structures that sustain greater than 80% damage are subject to different permitting requirements than those that sustain less than 80% damage. In Alabama the critical cutoff value is 50%. State statutes and guidelines need to be consulted prior to performing any damage assessments following a hurricane. Plans should be made to perform damage assessment in consultation with local authorities and building inspectors.

GPS Pathfinder Office is shipped with the GeoExplorer 3 GPS receiver. GPS Pathfinder Office is a software package that serves as an interface between your computer and the Trimble GeoExplorer 3 GPS receiver. This software allows the user to customize their GeoExplorer 3 to fit specific surveying/data collecting needs. You can plan the best times to collect GPS data by using the Quick Plan utility. GPS Pathfinder Office allows you to create separate projects, which allows you to manage data associated with each project effectively and conveniently. You can create and edit Data Dictionaries, these are used to control the data collection operation, allowing the user to select what type of data is needed for a given project. Using GPS Pathfinder Office you process your GPS positional data to improve its accuracy (Differential Corrections), convert GPS data to formats for use in other software programs like ArcView.



When GPS Pathfinder Office is opened, the Select Project dialog box will open. This is where you create new or open existing projects.

1. Project Name drop down menu (Choose from a list of existing projects.)
2. Create a New Project, Remove or Modify an existing project.
3. Performs the action you requested.

After a Project is created, you can perform a Quick Plan to see the best times for collecting data, or create your Data Dictionary. We will start by creating a Data Dictionary.

A Data Dictionary is used to augment the data collection. The Data Dictionary is created in GPS Pathfinder Office and then downloaded to the GeoExplorer 3. The Data Dictionary consists of a number of Fields in one or more tables that will store the data collected for a particular Feature. For instance, for the “House” table you will want to record a photo and disk numbers. These will be fields under “House” that will prompt the user to enter a photo number and a disk number once he or she starts collecting GPS data for the “House” Feature.



GeoExplorer 3 displaying the Features of a Data Dictionary. There are five Features displayed: (1) House, (2) Other Structure, (3) Jurisdictional Tree, (4) Pier, and (5) Dune Walkover. The “House” Feature is highlighted. Notice that the unit is ready to begin GPS logging (The Now command is highlighted). Upon pressing Enter the GeoExplorer 3 will be prompting for a Disk Number, then for the Photo Number.



Closeup of the Display.

Creating a Data Dictionary

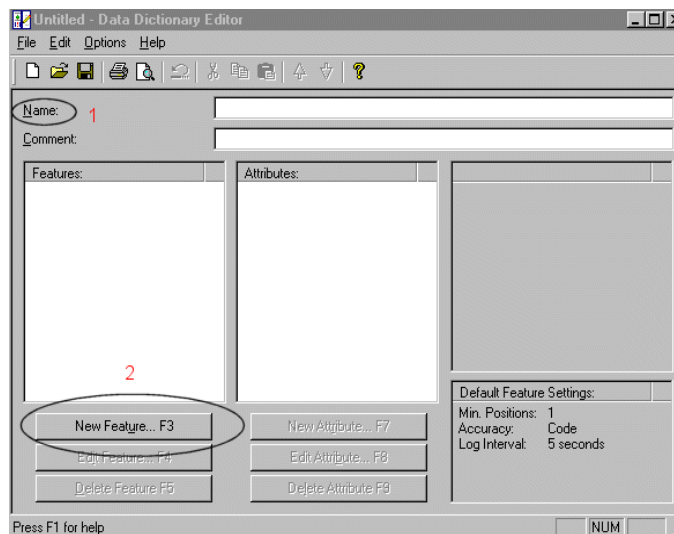
5



Open GPS Pathfinder Office.

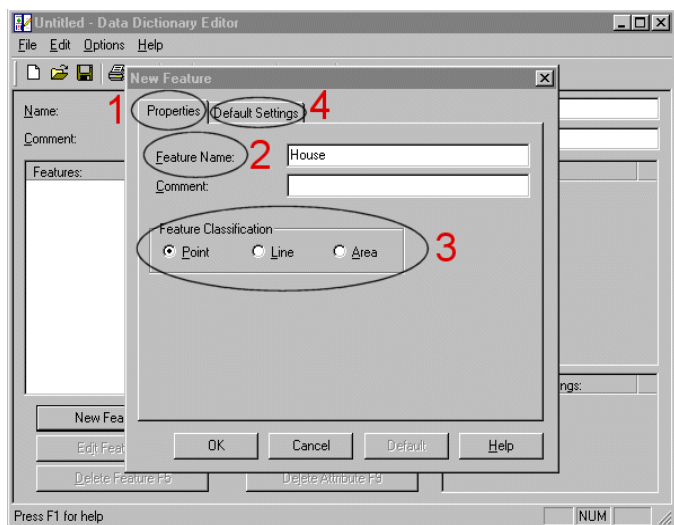
Under the “Utilities” menu select Data Dictionary Editor.

The Data Dictionary Editor window will open.



1. Name the Data Dictionary.

2. Select “New Feature” and the New Feature dialog box will open.



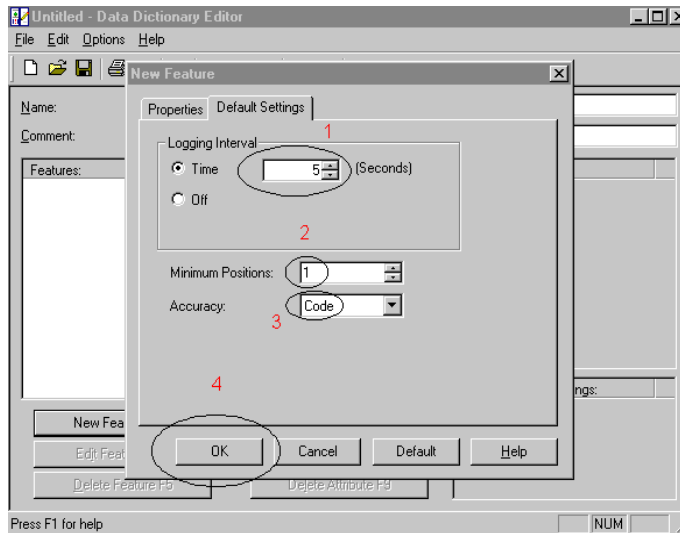
The New Feature dialog box.

1. Properties Tab.

2. Feature Name.

3. Feature Classification.

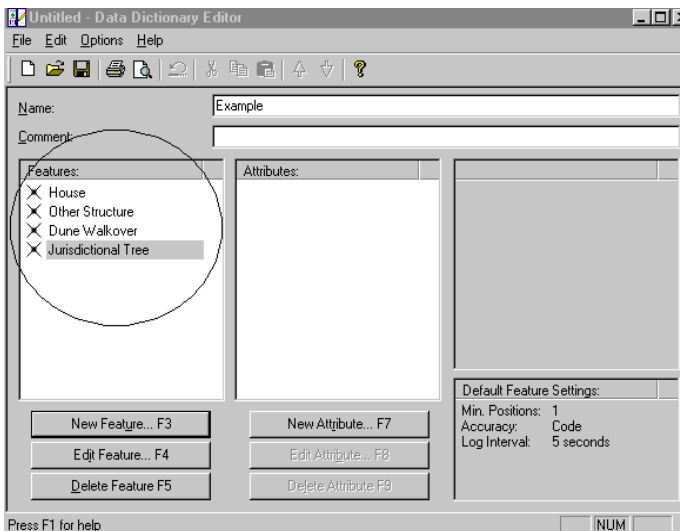
4. Select Default Settings Tab.



Default Settings. (Recommended.)

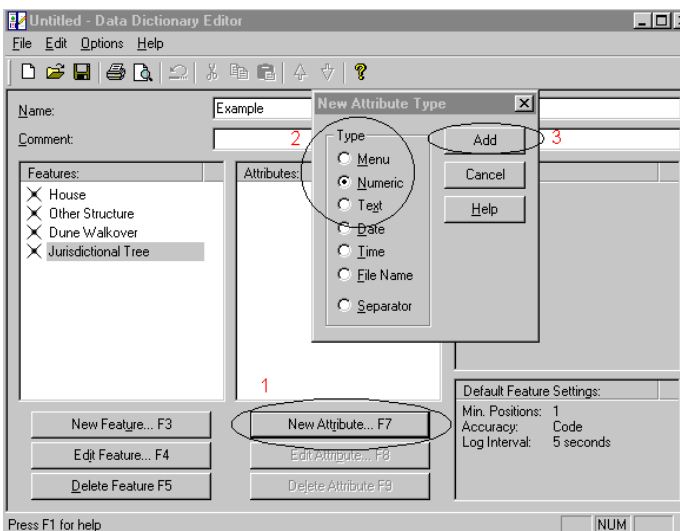
1. Enter Data Logging Interval. (5 Seconds)
2. Enter Minimum Positions.
3. Select "Code" for Accuracy.
4. Click "OK" to save the new Feature.

Perform these steps for all of the Features you want to include in your Data Dictionary.



Data Dictionary showing four Features that have been created.

Note: You are able to Edit or Delete a Feature or an Attribute at any time while you are in the Data Dictionary Editor. Just highlight the Feature or Attribute and select which operation you wish to perform.

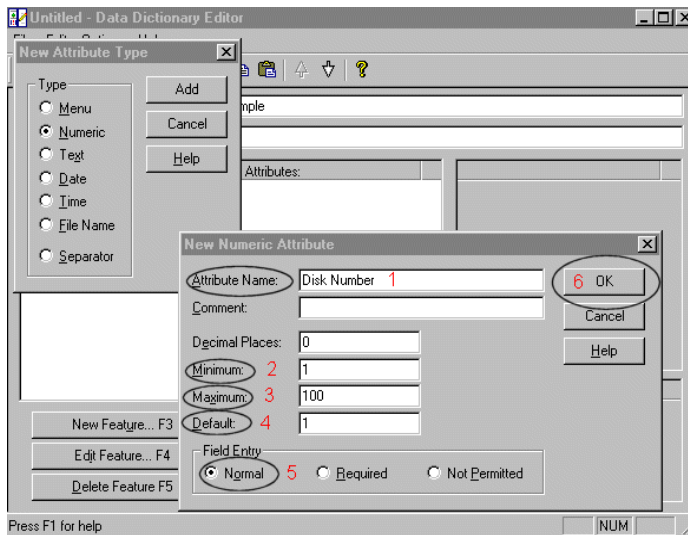


Adding Attributes to each of your Features. Highlight the Feature. This allows you to set up the Disk # and Photo # attribute fields.

1. Select "New Attribute"
The New Attribute Type dialog box Opens.
2. Select the Type of Attribute. This determines what kind of values populate a particular Attribute field.
3. Click "Add."

Creating a Data Dictionary

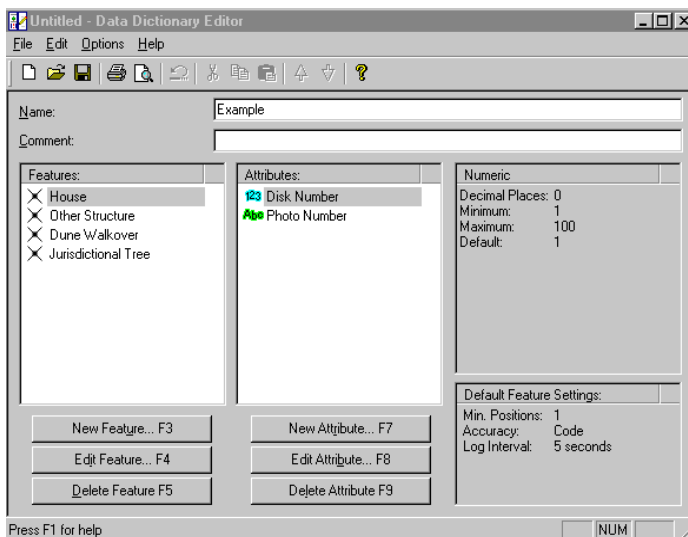
7



Numeric Attribute Type was selected. The New Numeric Attribute dialog box opens.

1. Name of Attribute
2. Minimum (Number of characters.)
3. Maximum (Number of characters.)
4. Default (Character.)
5. Field Entry.
6. Click “OK” to save.

If both Numeric and Text data is to be entered, choose the Text Type. Choose numeric for the Disk # and text for the Photo # .



Save your Data Dictionary. From the File Menu, select Save.

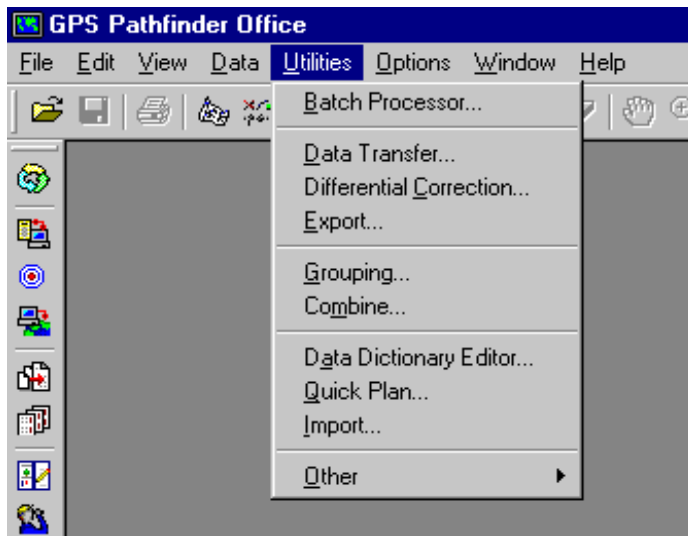
Remember which folder you saved your Data Dictionary in.

Note: Once you have created the Attributes for one Feature, you can “Copy and Paste” these Attributes to any other Feature.

Next you will need to transfer the Data Dictionary from your desktop to the GeoExplorer 3. This procedure is also accomplished within GPS Pathfinder Office. The cradle will need to be connected to your computer. Place the GeoExplorer 3 in the cradle. The following pages will step you through the process.

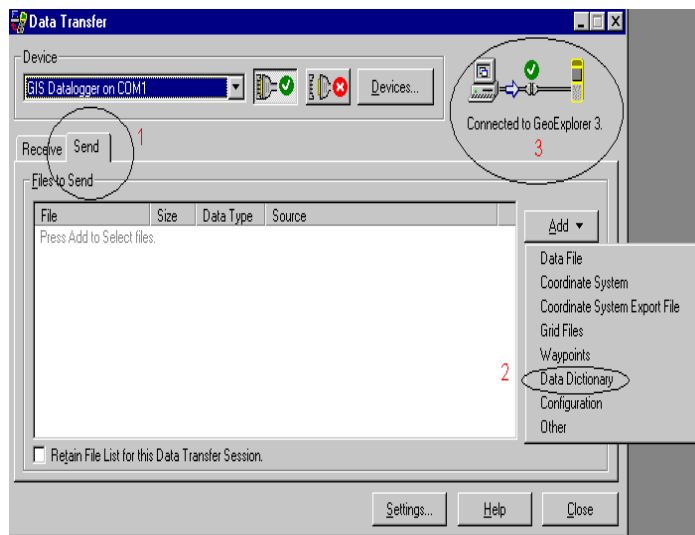
Data Transfer

8



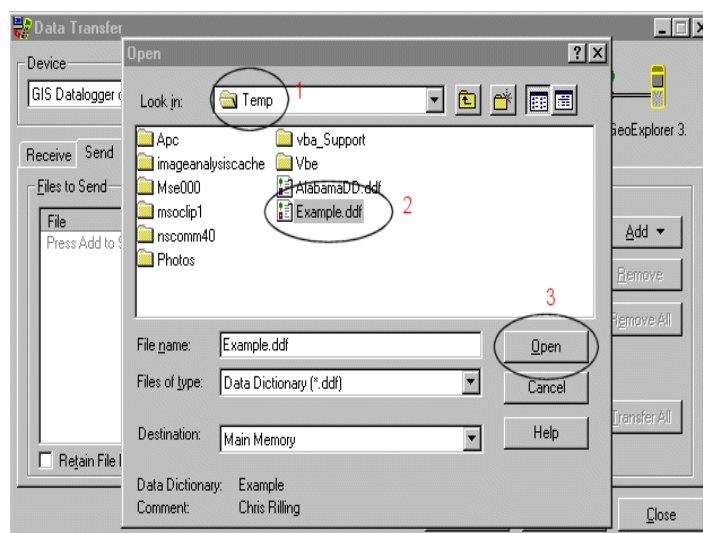
Under the Utilities menu choose Data Transfer.

Note: The cradle must be connected to your computer and the GeoExplorer 3 must be on before you start transferring data.



The Data Transfer window opens.

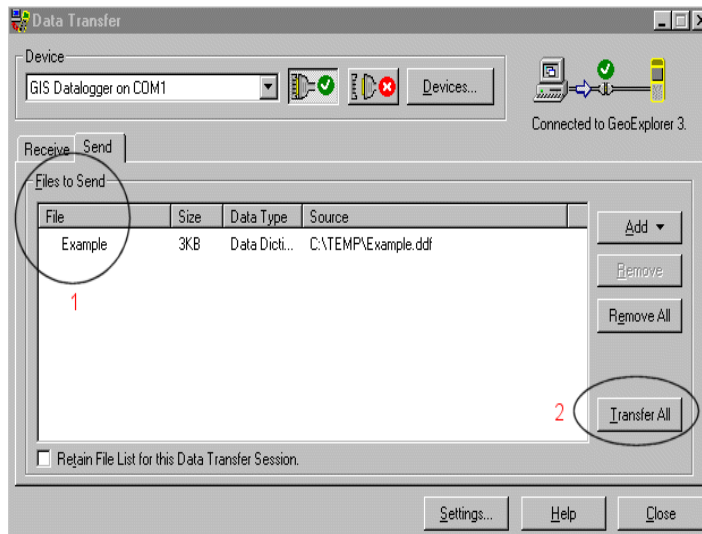
1. Select the Send Tab.
2. Under Add choose Data Dictionary.
3. Notice the direction of information, from the computer to the GeoExplorer 3.



1. Select the folder you saved your Data Dictionary in.
2. Highlight your Data Dictionary.
3. Select Open.

Data Transfer

9

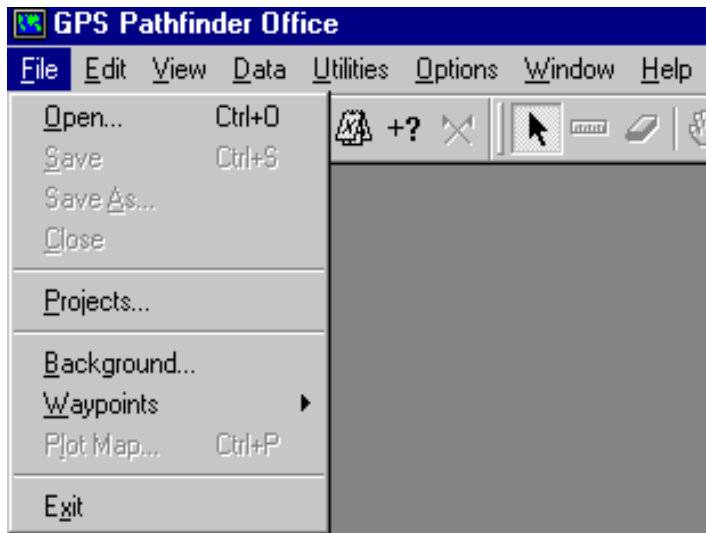


1. Select the Data Dictionary that you want to transfer.

2. Select Transfer All to send the Data Dictionary to the GeoExplorer 3.

After the transfer is completed, close window.

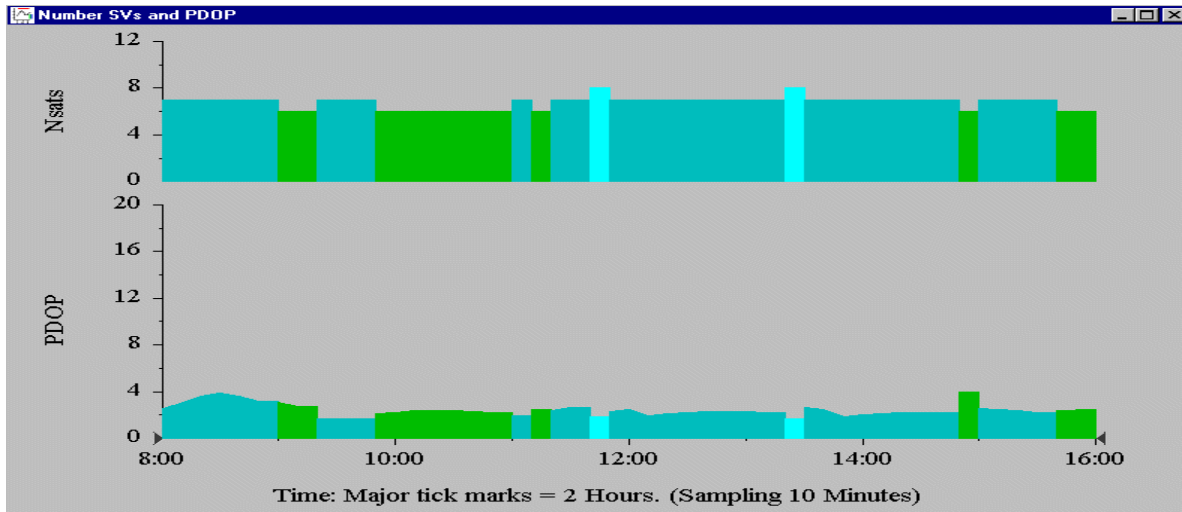
You may have more than one Data Dictionary to transfer. You can create and tailor them for any of your needs.



Exit Pathfinder Office.

Now that you have successfully created and transferred your Data Dictionary to the GeoExplorer 3, you are ready to go to the field and start collecting data.

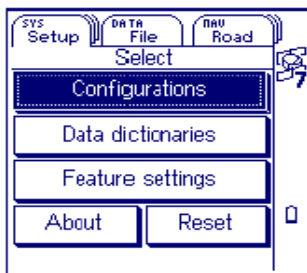
To assure that the best data is collected there are a couple of things that you should keep in mind. If possible, you should perform a Quick Plan to see the availability of satellites' during the time frame that you are planning on collecting data. The GeoExplorer 3 PDOP (Position Dilution of Precision) should be set at 6 or lower (Factory default is 6.5.) The PDOP is an indicator of the satellites' geometry and the accuracy of the position you are collecting. The GeoExplorer 3 unit should also be fully charged before departing for the field.



The chart above was created in GPS Pathfinder Office using the Quick Plan option under the utilities menu. The chart represents the number of Satellites and the PDOP. An Ephemeris file (current.ssf) for use in Quick Plan can be obtained at: www.trimble.com/satview/index.htm.



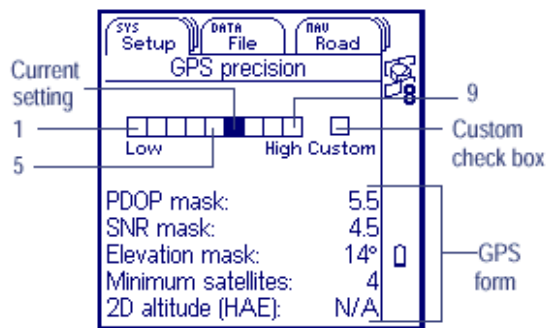
1. Power Button
2. SYS Button
3. Data Button
4. Nav Button



To view or change the PDOP mask setting in the GeoExplorer 3.

1. Turn on the GeoExplorer 3.
2. Press the "SYS" button until you see the Setup Tab.
3. Highlight "Configurations" then press the Enter.
4. Highlight "GPS" then press Enter.

At this point the GPS precision screen should be visible.



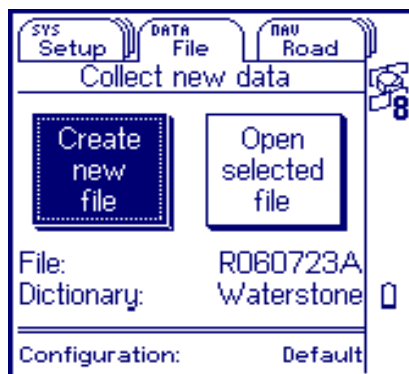
The PDOP mask setting can be either decreased or increased by pressing the Left or Right cursor key.



There may be circumstances where you will have to increase the PDOP mask, for instance if some of the satellite signals are obstructed due to trees or buildings. If the PDOP mask is increased you may want to collect additional data at the locations where the horizon is partially obstructed.

Note: Increasing the PDOP mask only effects the data collected when the PDOP is high.

Once you are on-site and ready to begin your data collecting, power on the GeoExplorer 3. The screen will display a rotating Trimble logo while it is booting up. The GeoExplorer 3 will immediately begin searching for satellites once the boot up procedure is completed. Press the Data button, the following screen will appear.



Notice that the Create new file option is highlighted. If Enter is pressed, the GeoExplorer 3 will use the Data Dictionary that is displayed on the screen. If this Dictionary differs from the one you want to use, scroll down and highlight Dictionary. Press Enter and a list of the Dictionaries that you have transferred to the GeoExplorer 3 will display. Choose the one you wish to load by highlighting it, then press Enter. The display will now show the name of the Data Dictionary that you chose. Before going on, you may want to write down the Rover File name in your log book for future reference.

The File name represents the following:

- R = Rover, the type of operation that the unit is performing.
 - 06 = Is the month that the file is created (Based on UTC.)
 - 07 = Is the day of the month (Based on UTC.)
 - 23 = Is the hour based on UTC (Universal Time Coordinated, can be changed to local.)
 - A = The first file created during the 2300 hr.
- Universal Time Coordinated. This is a time standard based on local solar mean time at the Greenwich meridian (Greenwich, England.)

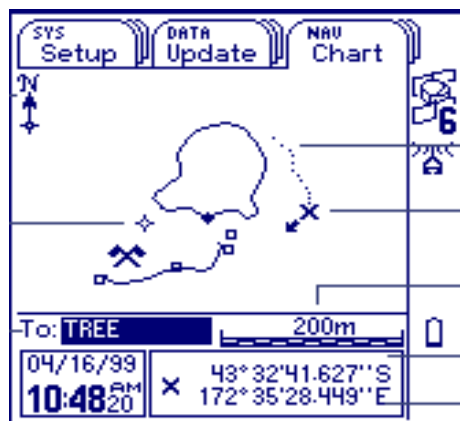
While the Create new file option is highlighted, press Enter. The next screen that will appear is “New feature.” Within this screen up to five Features will be displayed. To view all of your Features choices, use the down cursor to scroll through them. Select the Feature you want by highlighting the name and pressing Enter, (the GeoExplorer 3 will begin collecting data as soon as Enter is pressed.) The next screen that will appear is a list of the Attributes that you created for the Feature (the Disk # and Photo # fields you created for the Data Dictionary.) The first Attribute will be highlighted, press Enter, then enter the information that is requested, pressing Enter again will close the first Attribute. The next Attribute will become highlighted, press Enter and enter the requested information. This process will continue for all of the Attributes that are within your selected Feature. While you are entering this information the GeoExplorer 3 has been logging data. The pen icon in the lower right hand corner of the display should appear to be writing, showing the number of positions that have been taken. There should also be a number just below the satellite icon, this number reflects the number of satellites’ that the unit is tracking.



Example of the New feature display.

Note: If the number being displayed below the satellite icon is flashing, you may have to change your position or the direction in which you are facing.

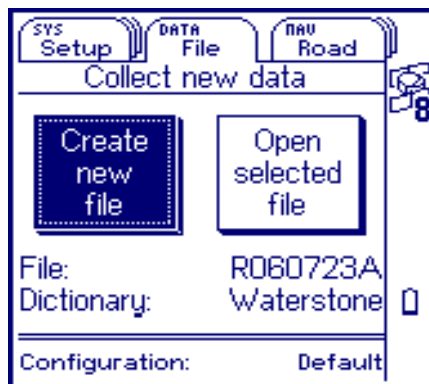
You may also want to write additional information in your log book, you can move between the three sections: SYS, DATA and NAV by pressing their white buttons. For instance, if you wanted to write down the position and the time that you are collecting data for each Feature, press the NAV button and the following screen will appear.



The date and time are displayed at the lower left corner. The position is displayed directly to the right of the date/time.

You can also cycle between each Tab within a section. For instance, while the NAV section is active, you can move between each Tab simply by pressing the NAV button. Pressing the button three times will bring you back to the screen you started on.

After writing down any additional information in your log book, press the Data button and check on the number of data sets that you have collected. The data sets are written based on the “log interval” that you entered when you created the Data Dictionary. If you used 5 seconds as your log interval, then every five seconds a data set is written. For the COHIS project, a minimum of 10 data sets per feature at five second intervals were collected. If you have achieved the desired number of data sets, press the “Close” button, this ends the data collection for this Feature. You will be returned to the “New feature” screen. Move on to the next Feature, begin this process again. After collecting the last feature, press “Close,” a screen asking you to “Please confirm, Close rover file?” will appear. Select “Yes” if you are finished, the screen will now return to the display shown below.

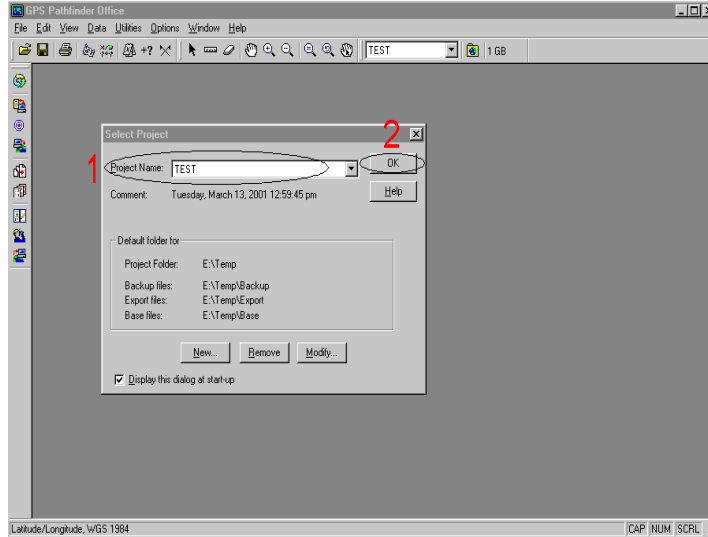


Example of Notes that you may want to keep while performing your survey.

Lat.	Long.	Disk #	Photo #	AZ	Dist.	Position	Desc.
.27958	.52348	1	1-2			1	Green House
.27927	.52446		99			2	

The Azimuth (AZ) and Distance (Dist) fields are used when you have to perform an offset. For instance, if you are unable to stand at the corner of a house, you would record an azimuth from your position to the corner of the house and measure a distance. This information would be entered as you are collecting data for a given feature by pressing the “Option” button. Enter the appropriate information and the GeoExplorer 3 will calculate the position based on the input azimuth and distance.

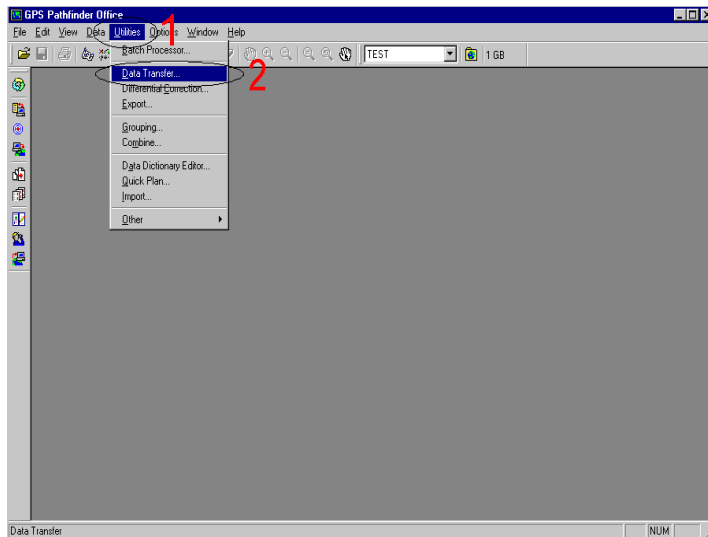
You have successfully complete your data collection. You will now need to download your data files from the GeoExplorer 3 to your computer.



Open GPS Pathfinder Office.

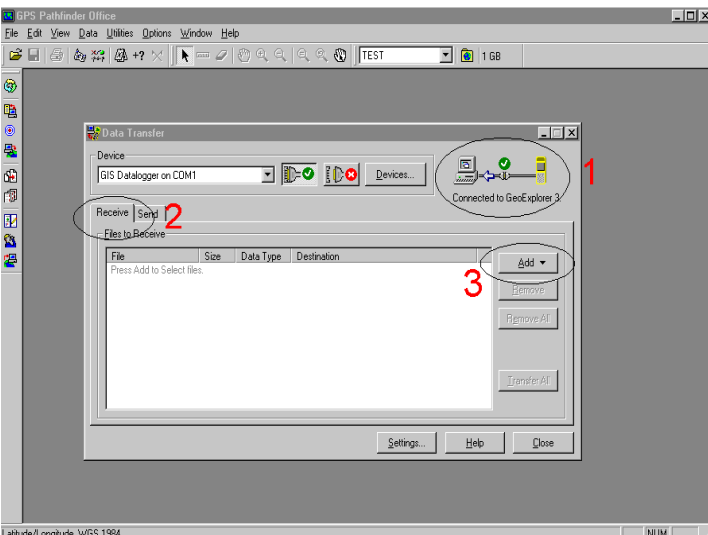
1. Choose the Project you are working in.
2. Click “OK.”

The Select Project dialog box will close.



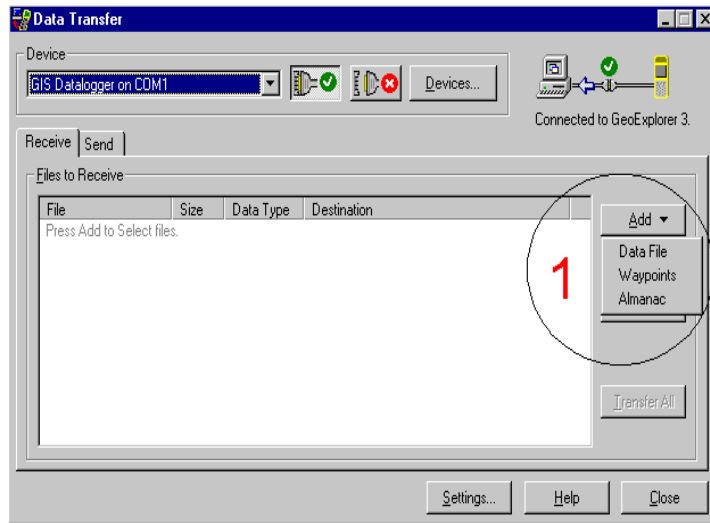
1. From the menu bar choose Utilities.

2. From the drop down menu, choose Data Transfer.

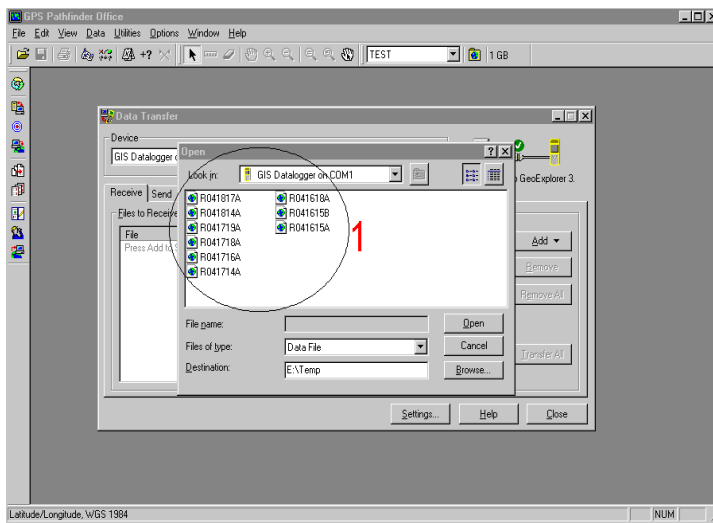


The Data Transfer dialog box opens.

1. Data from GeoExplorer 3 to Computer.
2. Select the Receive Tab.
3. Press Add.



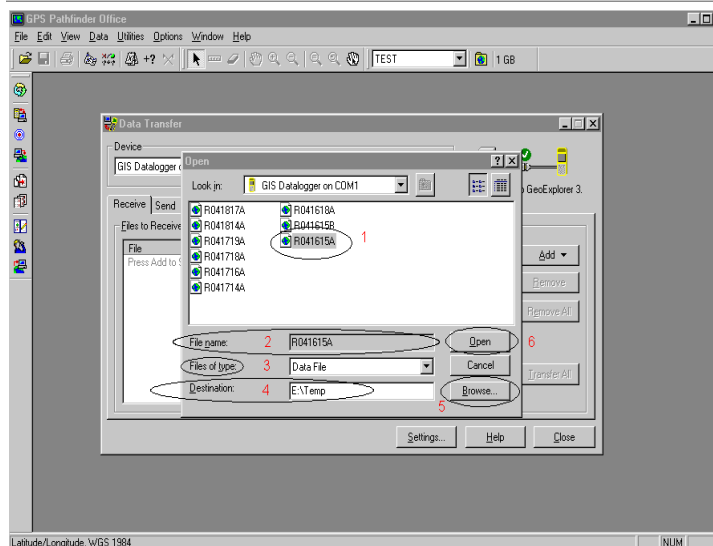
1. From the Add drop down menu select Data File.



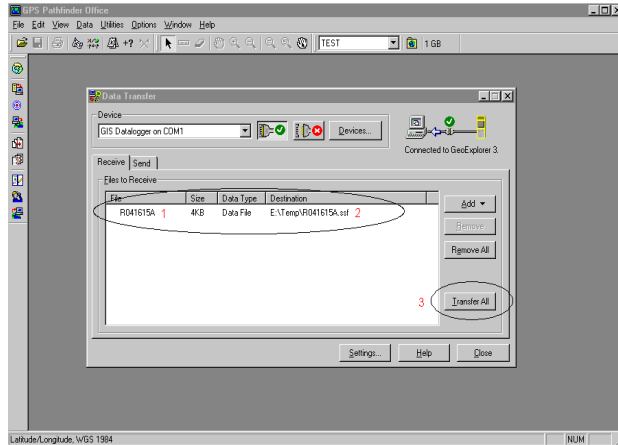
The Open dialog box will appear.

1. A listing of all the Rover Files that are in the GeoExplorer 3 will be displayed.

Note: Any rover files that have not been downloaded from the GPS unit will be highlighted.

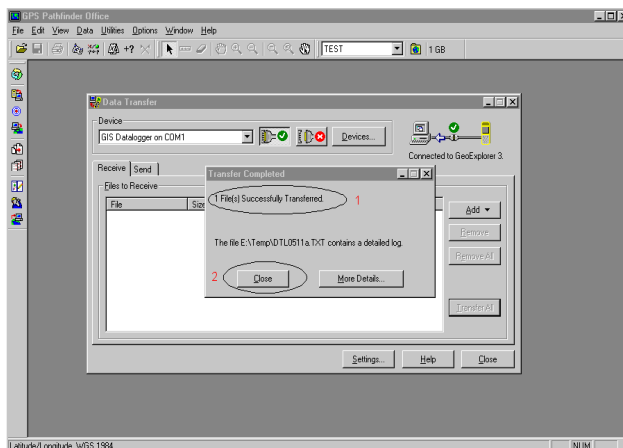


1. Highlight the Rover File(s) that you want to Transfer.
2. The file name(s) will display in the greyed out box.
3. Type of file to Transfer.
4. Destination. The location on your computer where the file will be transferred to.
5. The Browse button, use this to change the destination location.
6. Press the Open Button. This moves all selected files to the Data Transfer dialog box.



File to transfer being displayed in the Data Transfer dialog box.

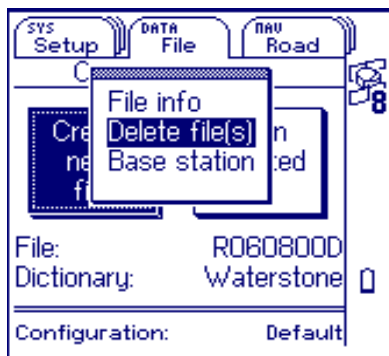
1. The Rover File name.
2. The Destination, Path and name of Data File being Transferred.
3. The Transfer All button. Press and all files listed will be transferred to their chosen destination.



Transfer Completed message box will appear after the file(s) are transferred to your computer.

1. Shows that the chosen file was Successfully Transferred.
2. Close out the message box.

You have now successfully downloaded your field work. At this point you may also want to backup your data on a second media source. The next section will cover Data Correcting.



Note: You cannot delete Rover files on the GeoExplorer 3 from GPS Pathfinder Office. Deletion of Rover files is accomplished by pressing the “Option” button while in the “Data” section of the GPS units operations. After pressing “Option” the screen on the left will display. Highlight “Delete file(s)” and press “Enter,” all of the Rover files that are in the unit’s memory will be displayed. Select the file(s) that you have downloaded and backed up to be deleted. This will keep the memory from running low while collecting data. If the memory starts to run low, an icon will appear on the right hand side of the screen.



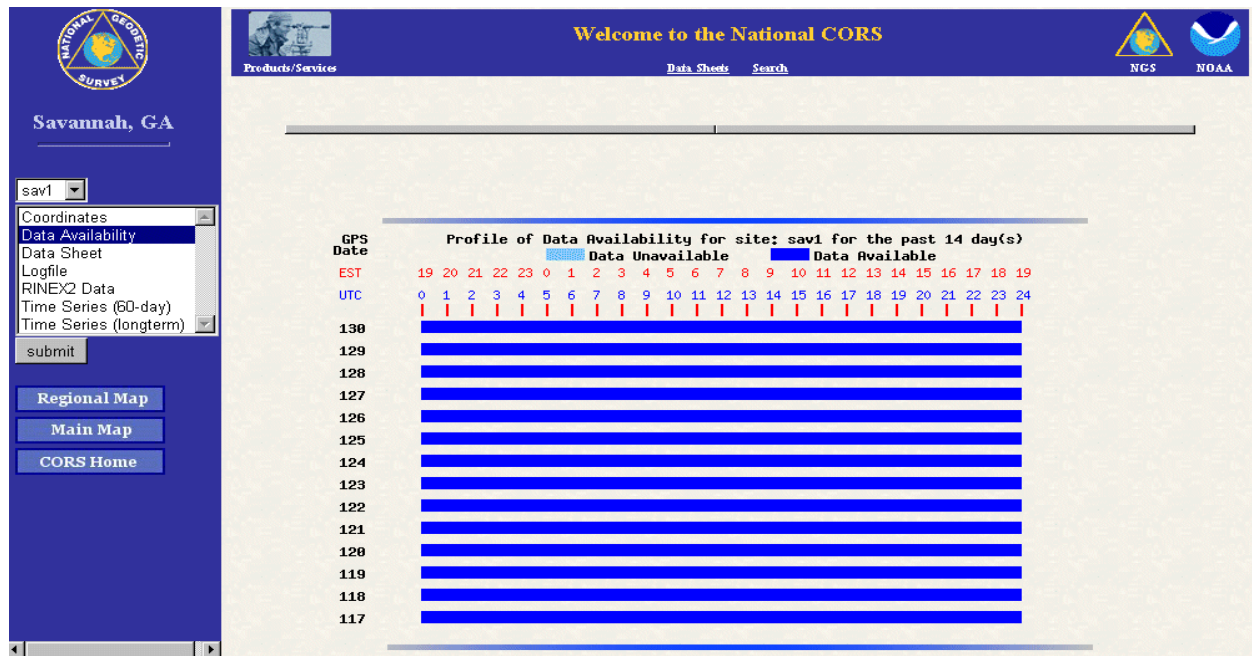
This “Chip” icon will display when the memory starts to run low.

While collecting data in the field, the GPS positions obtained are based on a prediction of where the satellites' will be. To obtain a higher degree of accuracy, you will want to correct your data. This process takes the raw data that was collected in the field and corrects (adjusts) the position of your Features, based on the satellites' known position at the time the data was collected. The corrected satellite codes are retrieved from the Continuously Operating Reference Stations (CORS.)

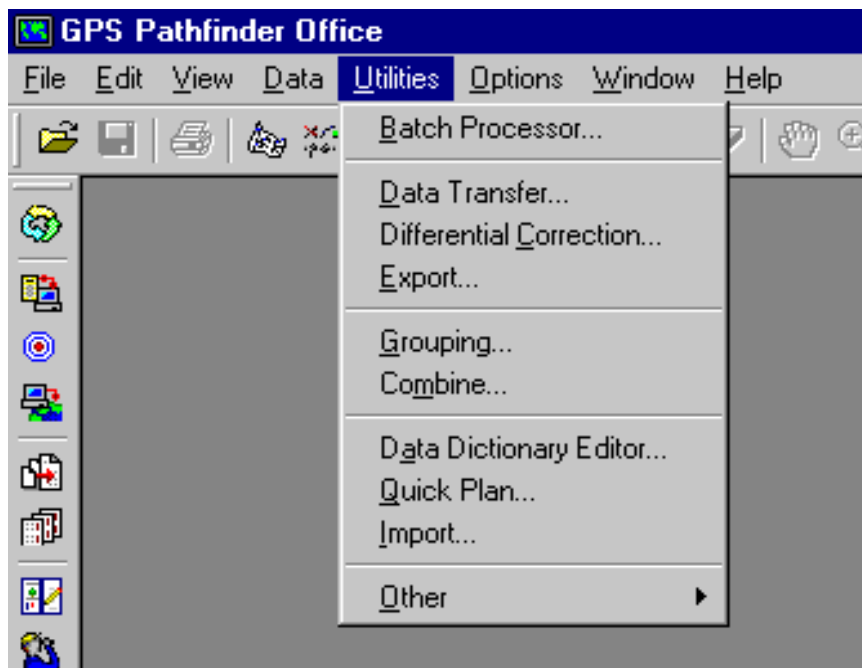
At the following web address you can locate the nearest CORS by activating the (*map*) link. <http://www.ngs.noaa.gov/CORS/>. Then by clicking on the area of the map where you performed your survey, a view of the CORS in that region will be displayed. You can also check on the availability of data. Let's say that you collected data on a Friday, it's late by the time you return to the office, and you plan to wait until Monday morning to download and correct the data. Monday morning you can check on the availability of data for a particular CORS before you try to correct your data to that site. If data is not available, choose another site. First choice should always be the site which is nearest to the area where you performed your data collecting. To see if data is available, after clicking on the region where your survey was performed, click on a particular CORS. A map showing the location of the site chosen will appear.

The screenshot displays the National CORS website interface. On the left, a sidebar contains the National Geospatial Survey logo and a location dropdown set to 'Savannah, GA'. Below this is a menu with options: 'Coordinates', 'Data Availability', 'Data Sheet', 'Logfile', 'RINEX2 Data', 'Time Series (60-day)', and 'Time Series (longterm)'. A 'submit' button is located below the menu. Further down are three buttons: 'Regional Map', 'Main Map', and 'CORS Home'. The main content area features a map of Savannah, GA, with the SAV1 CORS station marked with a blue square and labeled 'SAV1'. The map shows various roads, including Bulloch Bay Rd, Hwy 67 W, Hwy 67 E, and Hwy 67 S. The top of the page has a blue header with the text 'Welcome to the National CORS' and logos for NGS and NOAA. Navigation links for 'Products/Services', 'Data Sheets', and 'Search' are also present.

One of the options in the menu on the left is “Data Availability.” Highlight that option then press the “submit” button and the following screen will appear.



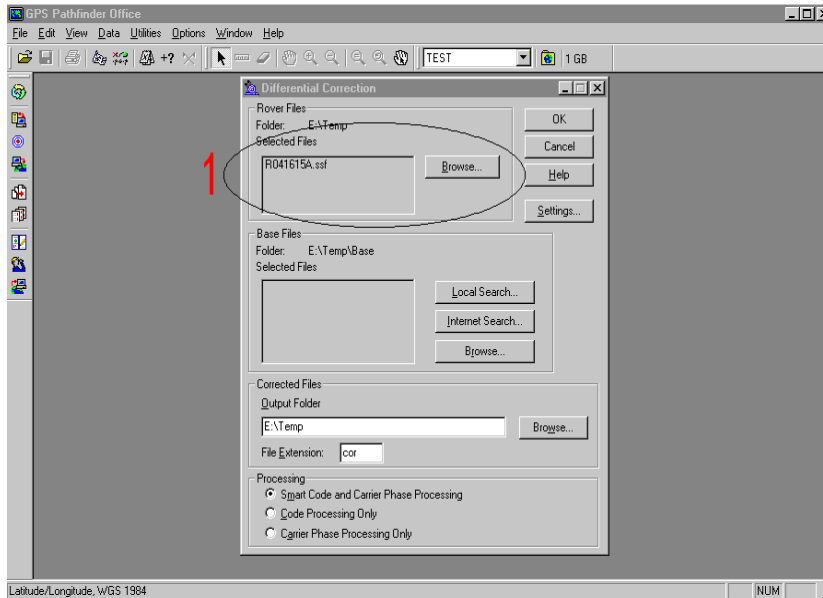
The graph shows the data that is available for the past 14 days. The GPS Date, represented by the Julian Day (Day 1 being January 1st, Day 130, shown on this chart would be the 10th of May) is displayed along with the hours that data is available. This graph indicates that data is available for sav1 for the past 14 days. If you had collected data on any of these days you will be able to correct your data using this CORS. If data had not been available for sav1 on the day that your survey was performed, good corrections can still be obtained from CORS quite far from a survey location.



Open GPS Pathfinder Office.

Select Utilities from the menu bar.

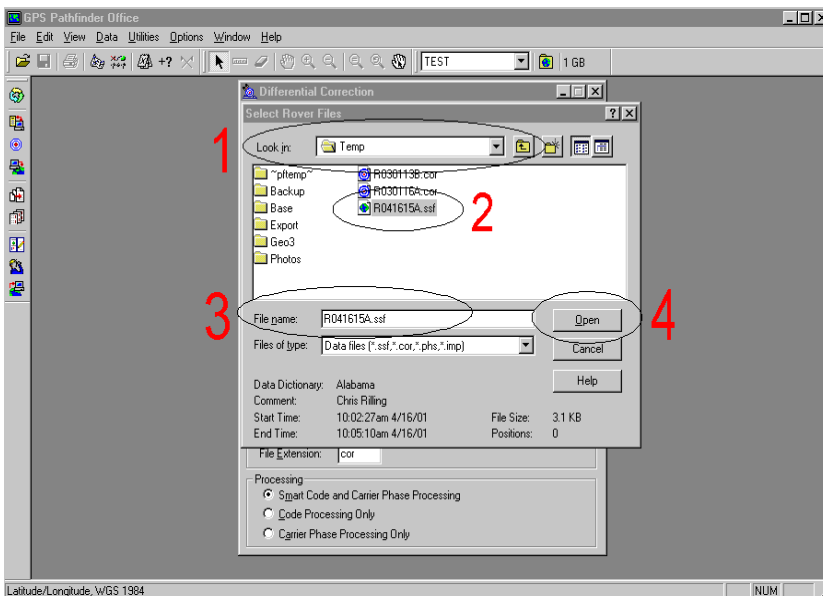
Select "Differential Correction."



Differential Correction dialog box opens.

1. The Rover file(s) that you want to be corrected.

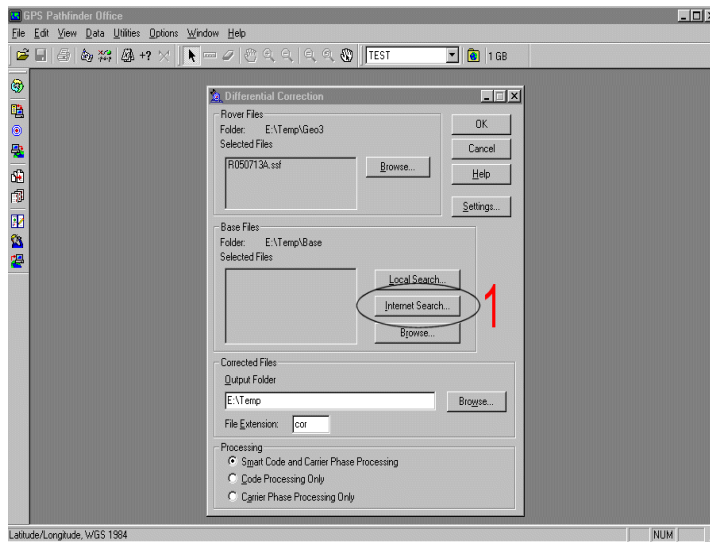
Note: Use the Browse button to locate the Rover file(s) that you are going to correct if they are not displayed in the box.



A typical Windows browse window will open.

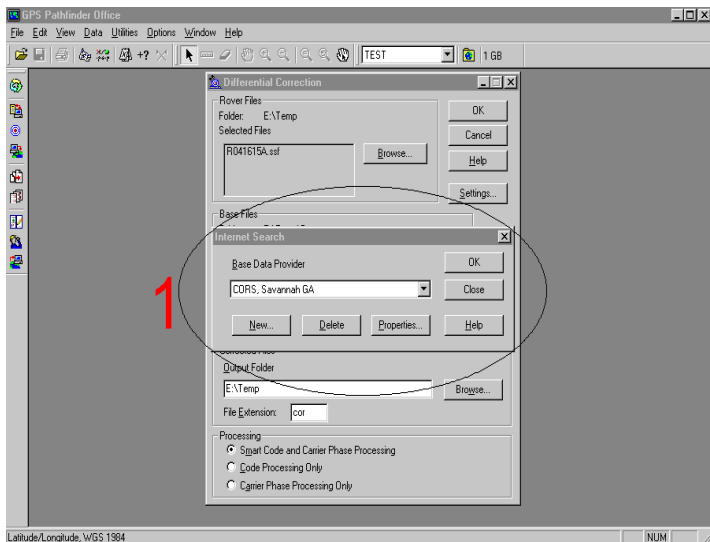
1. The folder where your Rover file(s) are stored.
2. Select your file(s) by highlighting them.
3. Selected file(s).
4. Press "Open."

After selecting the Rover files that you want to correct, perform an internet search for the specific CORS that you want to use.



Perform an Internet Search.

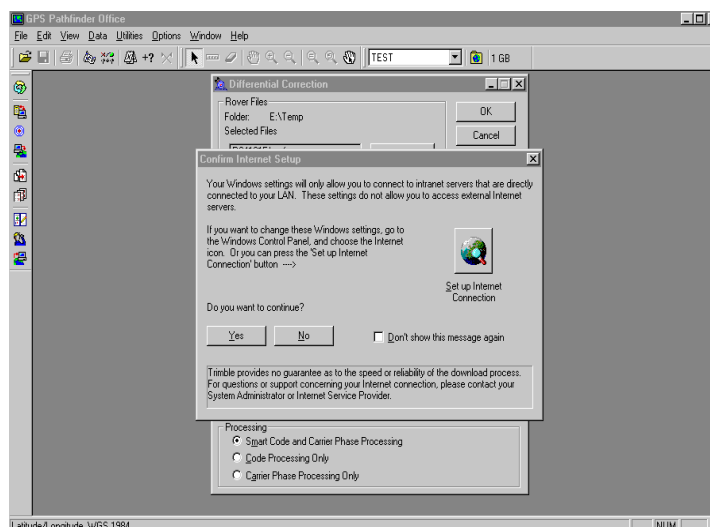
1. Click “Internet Search.”



The Internet Search dialog box.

1. This window should contain the CORS that you want to use.

A CORS can be added to your list by pressing “New.” The GPS Pathfinder Office software will retrieve a list of all the current CORS. Make your selection.



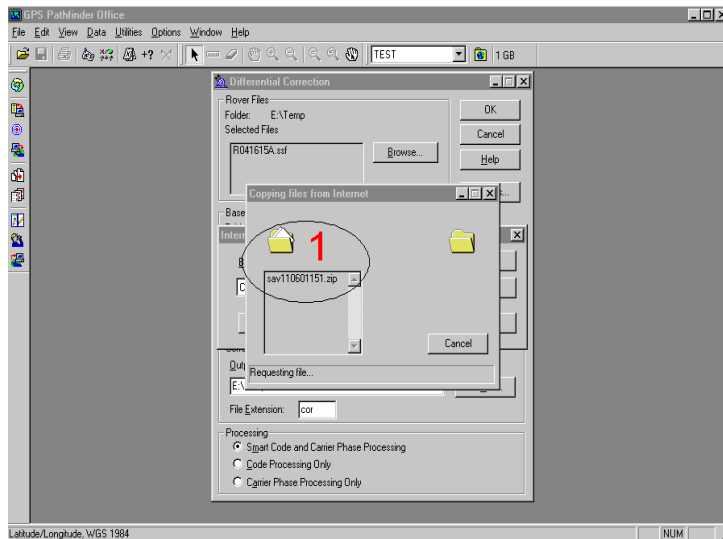
Confirm Internet Setup.

The Internet connection will need to be setup per your service.

Pressing the “Yes” button will start the Internet search for the CORS.

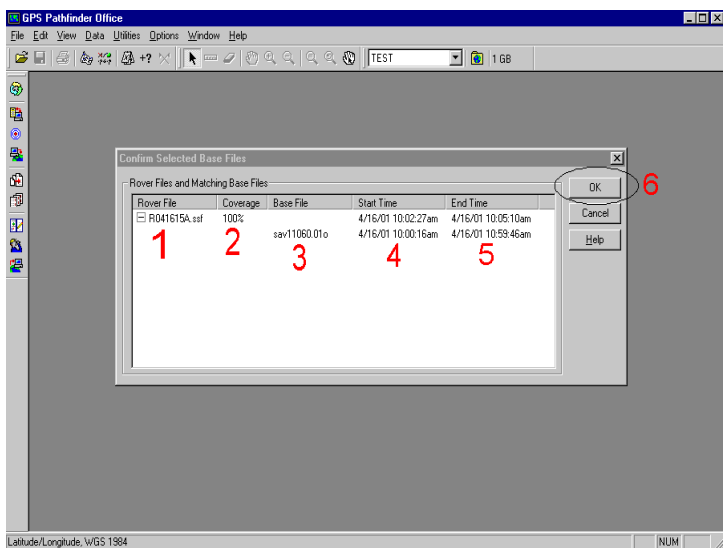
Data Correction

21



Copying File From Internet.

1. The data set from the CORS that was selected.

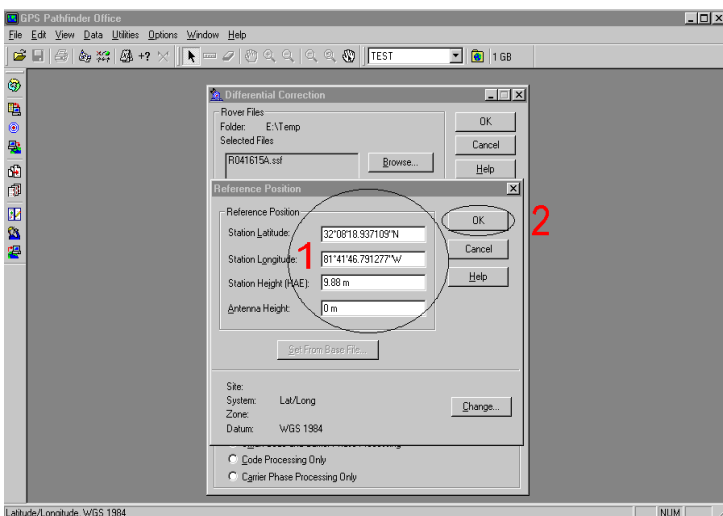


Confirm Selected Base Files dialog box.

1. Rover File Name.
2. Amount of Coverage (Satellite.)
3. Base File Name.
4. Start Times for both Files.
5. End Times for both Files.

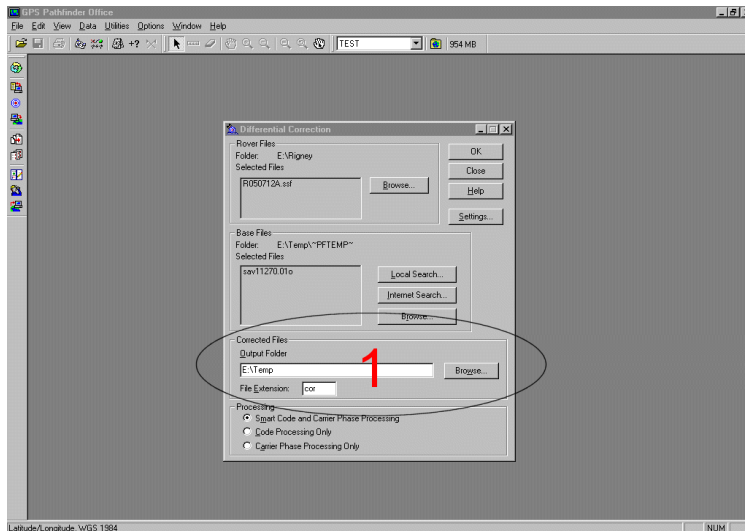
It is important to check the amount of coverage. If there is less than 100 percent coverage you may want to use another CORS.

6. Click “OK”



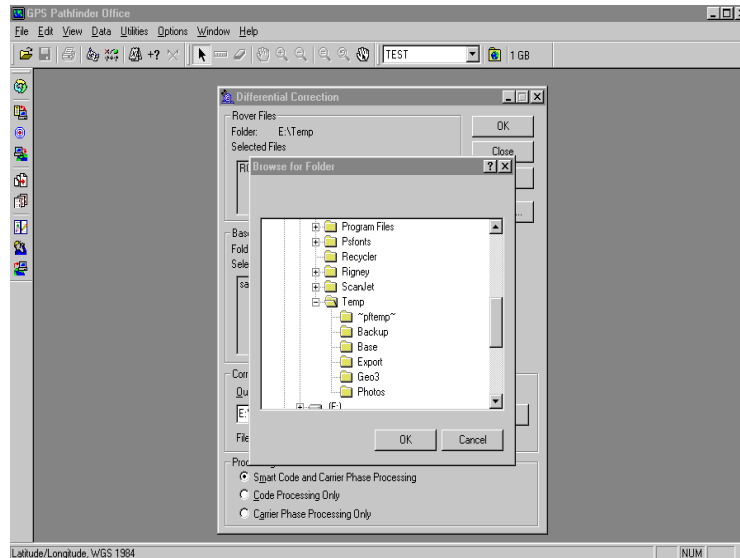
Reference Position dialog box.

1. The Latitude, Longitude, Station Height and Antenna Height of the selected CORS.
2. Click “OK” and the window closes.



Next you will want to select the location to store your corrected file.

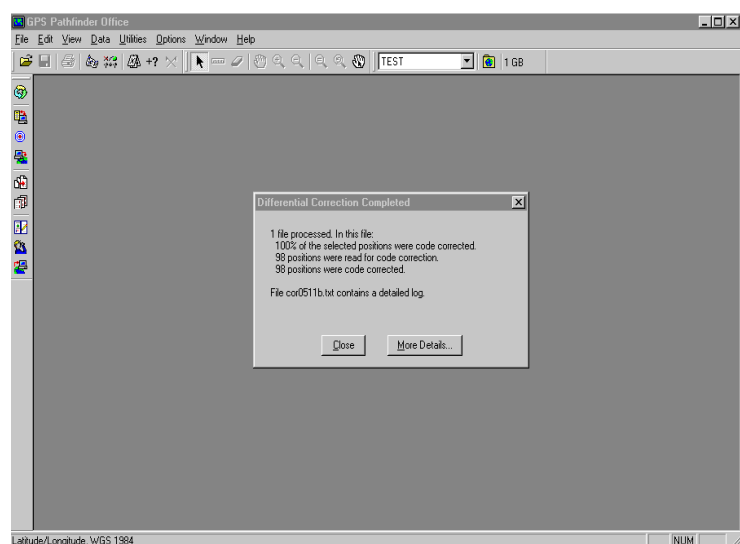
1. Output Folder. This shows the location where the corrected file will be sent. To change the location press the “Browse” button.



Browse for Folder dialog box.

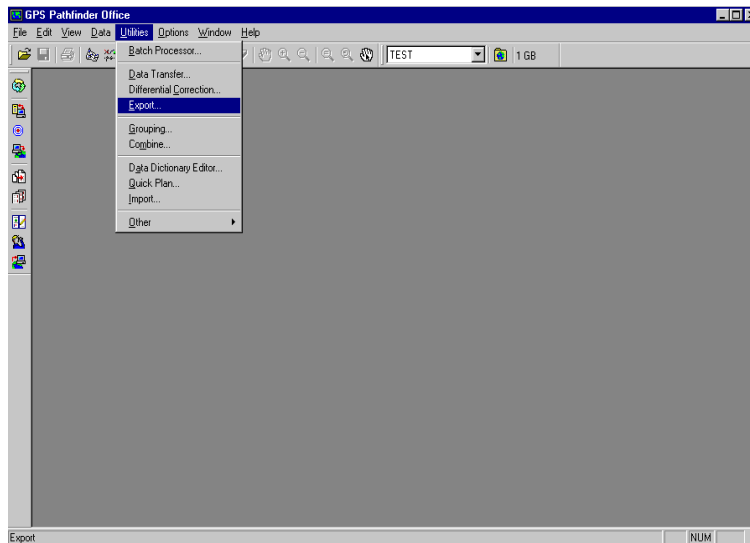
Use this window to find the location (Folder) where you want your corrected files to be stored. Select a Folder, double click on it and it will open. Click “OK.”

Differential Correction Completed message window.

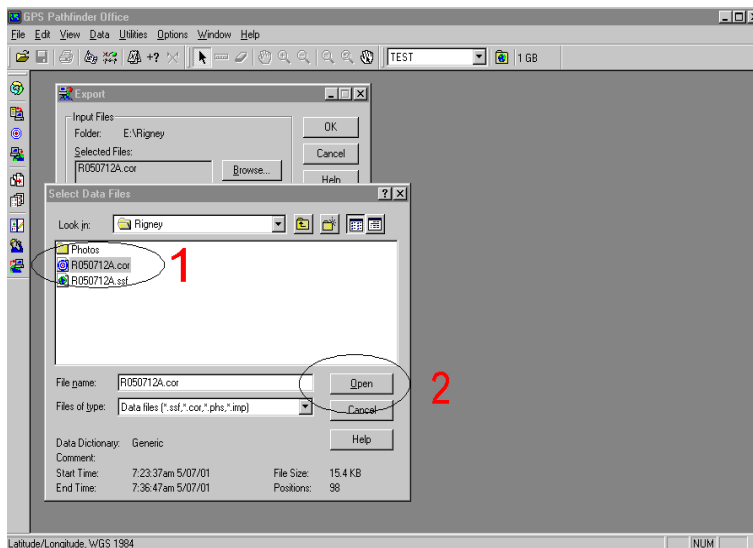


This window shows that 1 file was processed. 100% of the positions were corrected. The Rover File contained 98 positions and all of them were corrected. This window also displays a text file name. This file contains detailed information about the CORS and the Rover file, the file can be viewed with any text utility program like Notepad. Click “Close.”

You have now successfully corrected your data. Next you will want to convert the corrected data to a file that can be used in your ArcView project. GPS Pathfinder Office will allow the user to Export data in a number of formats. For the COHIS project, we will Export the data as an ArcView Shapefile. This will place the data in a format that can easily be included in the project. The following pages will step you through the process.



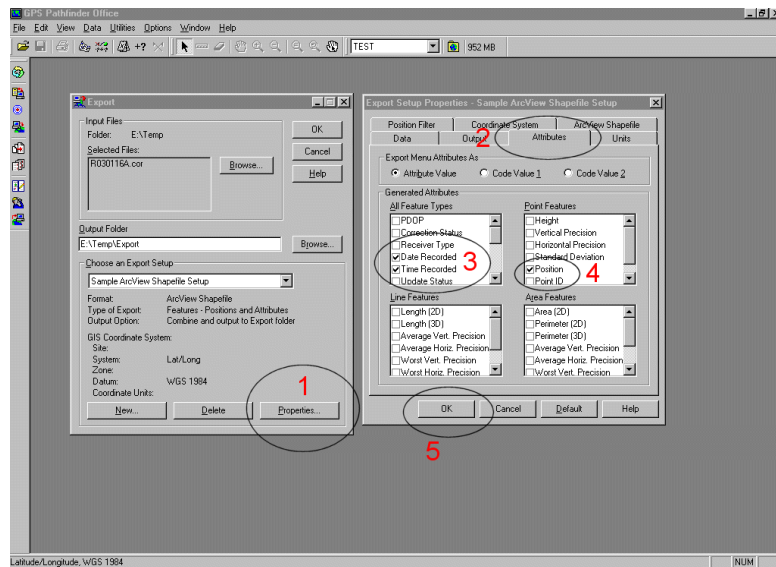
Under the Utilities drop down menu, choose Export.



The Export dialog box will open. Under Input Files choose Browse to locate the Folder which contains the file to export.

1. Your corrected file will have the **.cor** extension.
2. Highlight the file and click "Open."

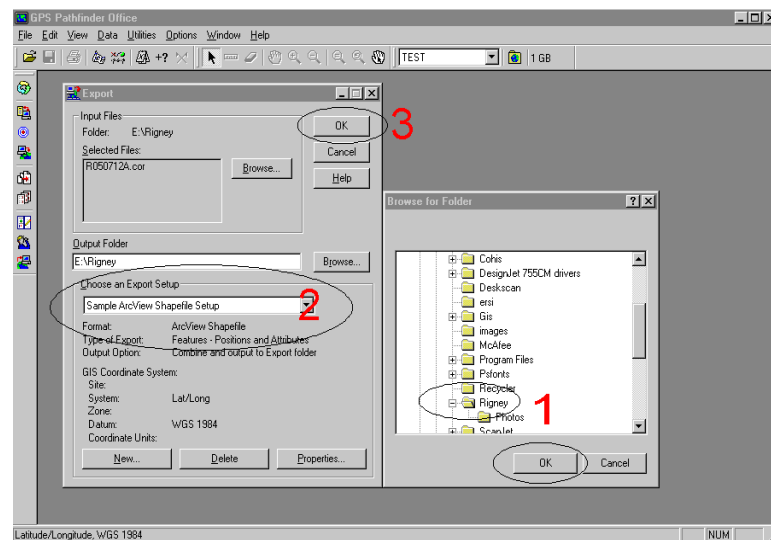
Note: You may have more than one file to Export. By holding the Ctrl key down you can select the files that you want to Export.



Export Setup Properties

1. Click on “Properties.”
2. Select the “Attributes” tab.
3. Check “Date & Time” boxes.
4. Check “Position” box.
5. Click “OK.”

This process includes the Date, Time and Position of your Features in the Attribute Table.



1. Select the Output Folder then click “OK.”

2. Under “Choose an Export Setup,” make sure that the “Sample ArcView Shapefile Setup” is selected.

3. Then press “OK” at the upper right hand corner of the Export dialog box. This will start the conversion process.



Export Completed message.

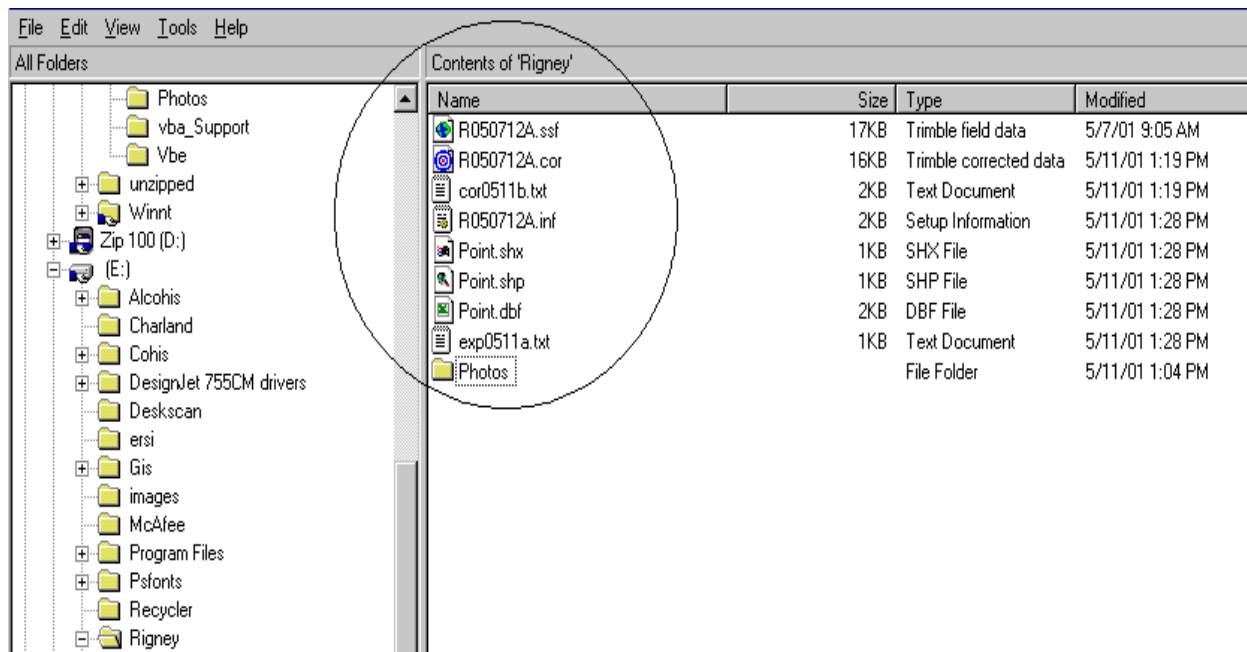
This window displays that one input file was read. The file contained 98 positions. The input file contained a total of 9 Features. This also shows the type of Features, for this example they were “Point Features.” All 9 Features were exported.

There is also a text file that is created which can be viewed.

You have now successfully created your shapefiles for your ArcView project. This process created three files. The three file extensions are **.shx**, **.shp** and **.dbf**.

The shx extension is spatial data index, shp is spatial data (shape geometry) and the dbf extension represents attribute data.

Data management is very important. At this point you may want to rename your exported files to something unique. By renaming your files, you avoid the risk of your files being overwritten the next time you export data. Since all three file types are created when you export, make sure to rename all three files.

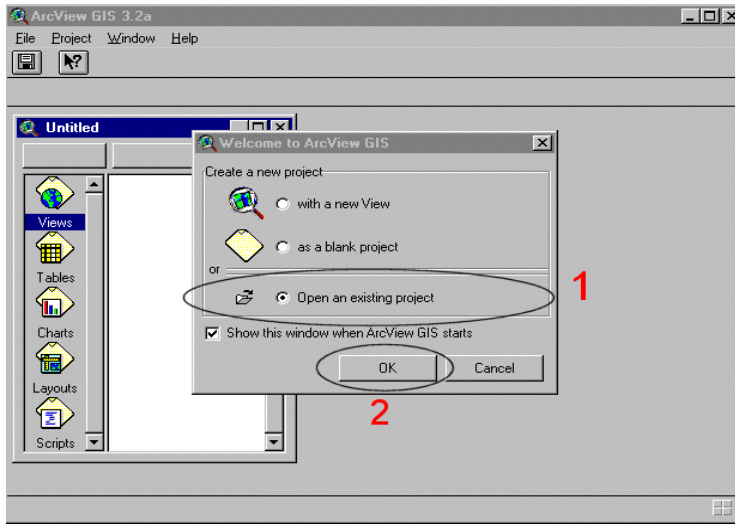


This folder displays the file types (input and output,) that we have been working with.

Notice the three exported files, **Point.shx**, **Point.shp** and **Point.dbf**. If another Rover file containing the feature “Point” was exported to this folder, the output files would overwrite these three. It should also be noted that you will have these three file types for any type of “Feature” you collect data on. For instance, if the Rover File had contained data collected on a Pier, Dune Walkover or Jurisdictional Tree, you would have three files for each feature type.

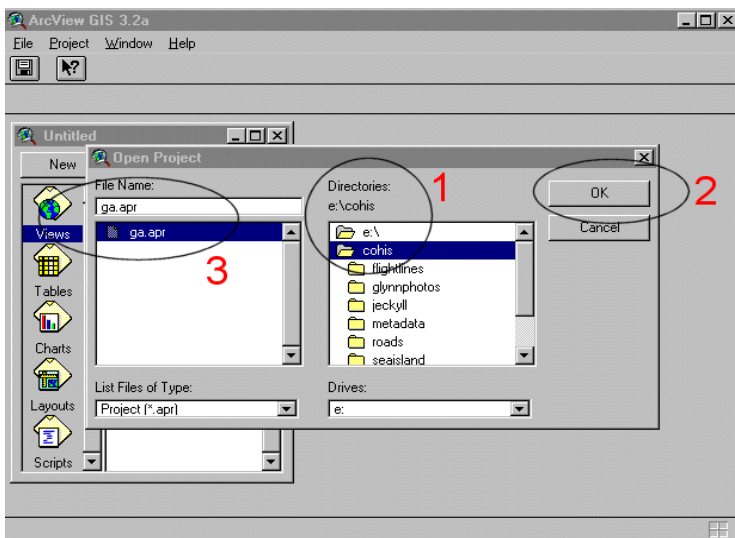
The COHIS ArcView GIS Project is a very powerful tool! There are many uses for this project, from identifying natural areas needing protection, emergency planning in residential areas, to managing resources after natural disasters.

The following pages will demonstrate how to import newly collected data (shapefiles) into the COHIS project. Open ArcView.



When ArcView opens you have the following choices: Create a new project, with a new View, as a blank project or Open an existing project.

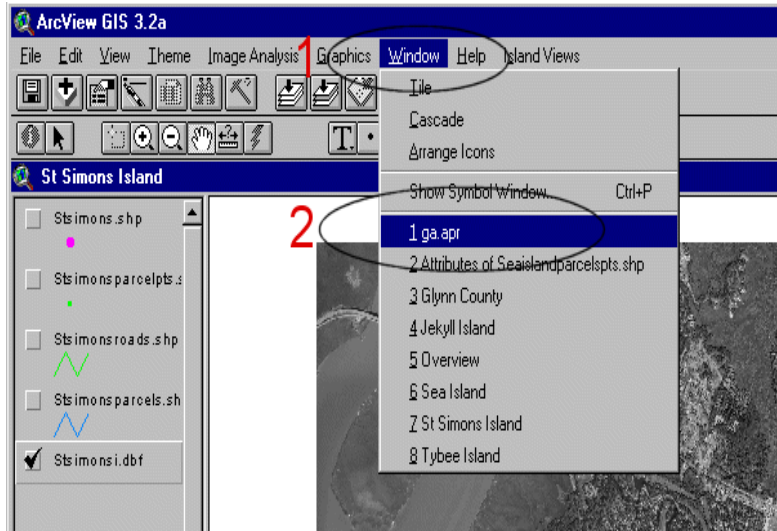
1. Choose Open an existing project.
2. Press “OK.”



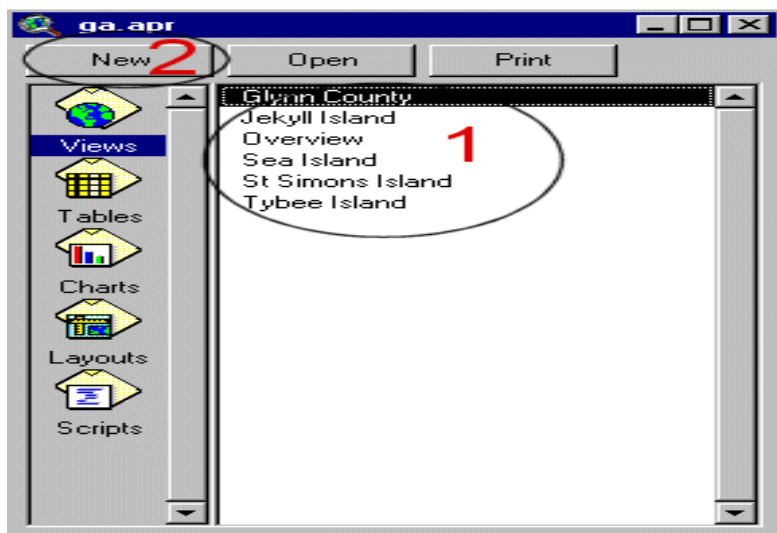
The Open Project dialog box.

1. The folder where the project is located.
2. The project name. ArcView,s project file extension is **.apr**.
3. Click “OK” to load the project.

Since the COHIS ArcView project is projected in a specific coordinate system (State Plane 83) the data (Shapefiles) has to be projected in the same system.



1. The Window drop down menu.
2. Select project view. *.apr.



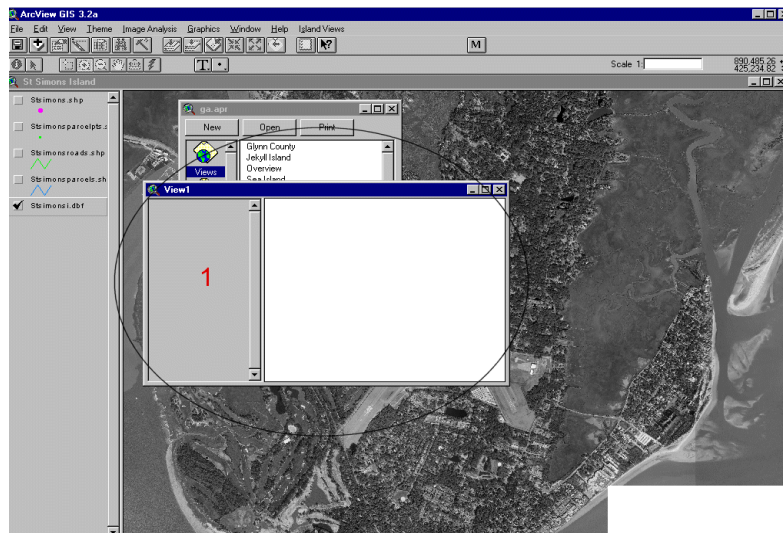
Project Window.

1. List of all the Views contained in the project.

Note: Views is highlighted in the left menu.

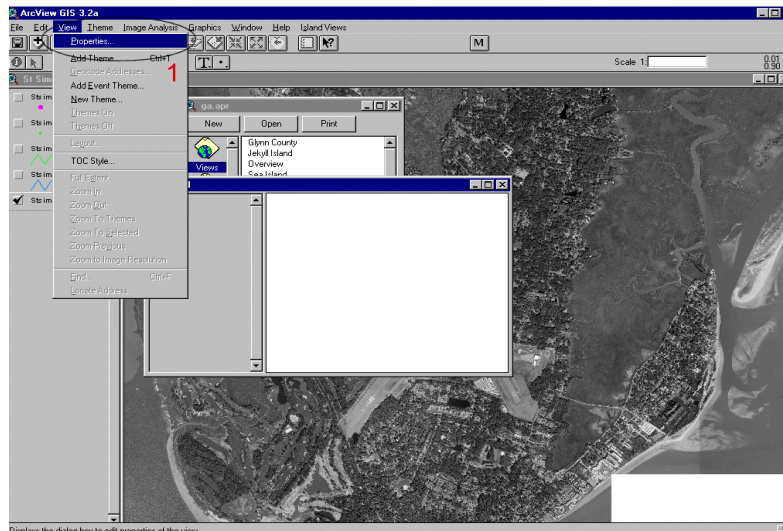
2. Choose “New.”

Adding a New View to your project will allow you to select the coordinate system in which you want the View projected. The shapefiles that you exported need to be in the same coordinate system as your project or they will not display correctly. After creating a new View, the shapefiles will be added as Themes, these Themes will then be converted to shapefiles which will be in the correct coordinate system. The following pages will step you through this process.



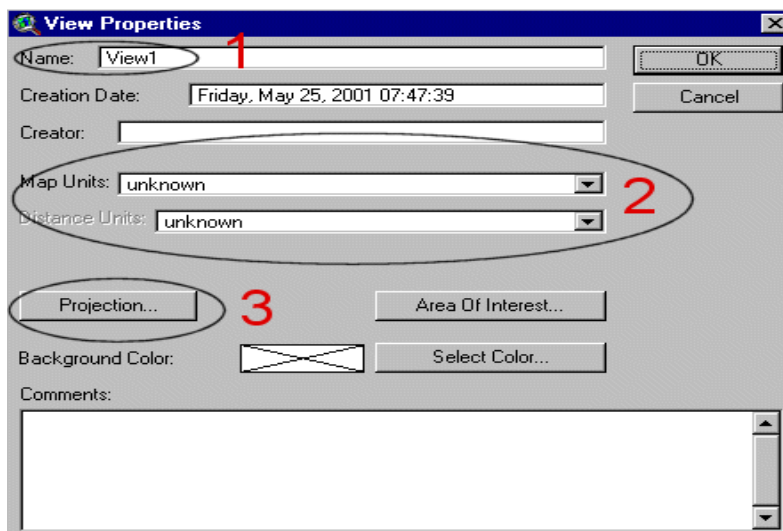
1. Empty View.

You will now need to set the properties for this View.



1. From the View drop down menu choose "Properties."

The View Properties dialog box will open.

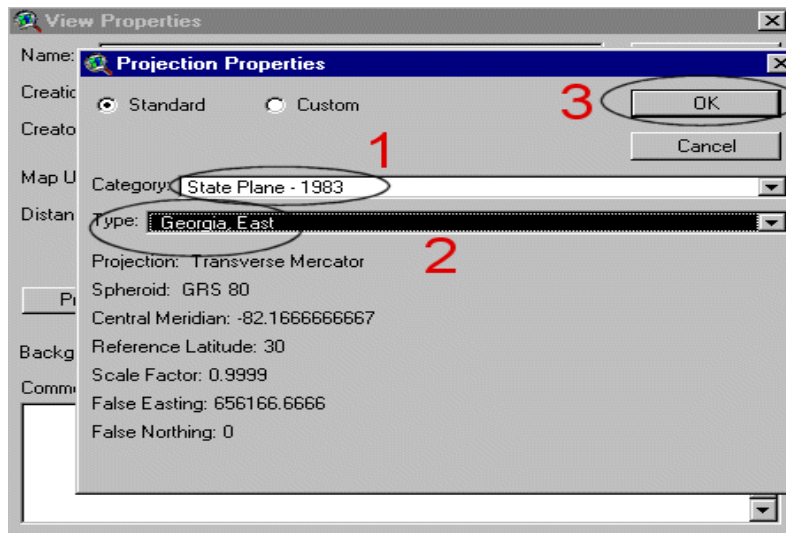


View Properties dialog box.

1. View's Name, leave as default.

2. Map Units, change to Feet.
Distance Units will also be in Feet.

3. Select "Projection." The Projection dialog box will open allowing you to select which coordinates system you want the view displayed in.

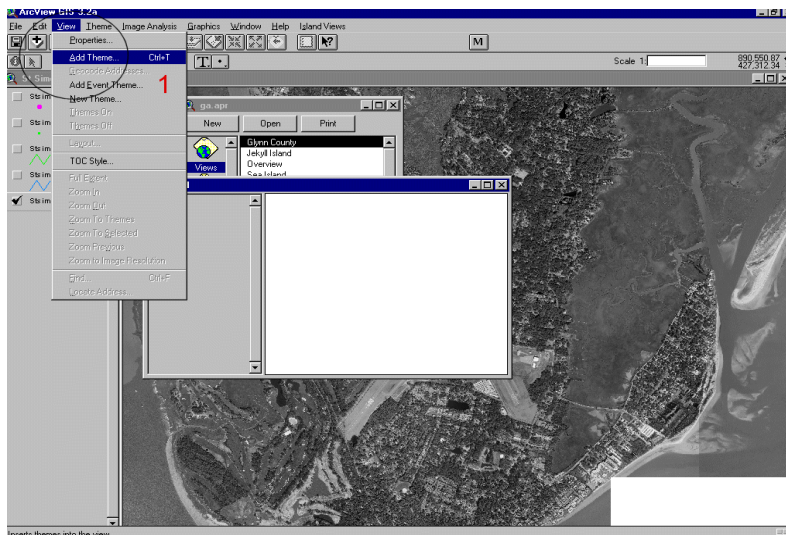


Projection Properties.

1. Choose “State Plane - 1983.”
2. Choose the appropriate type.
3. Click “OK.”

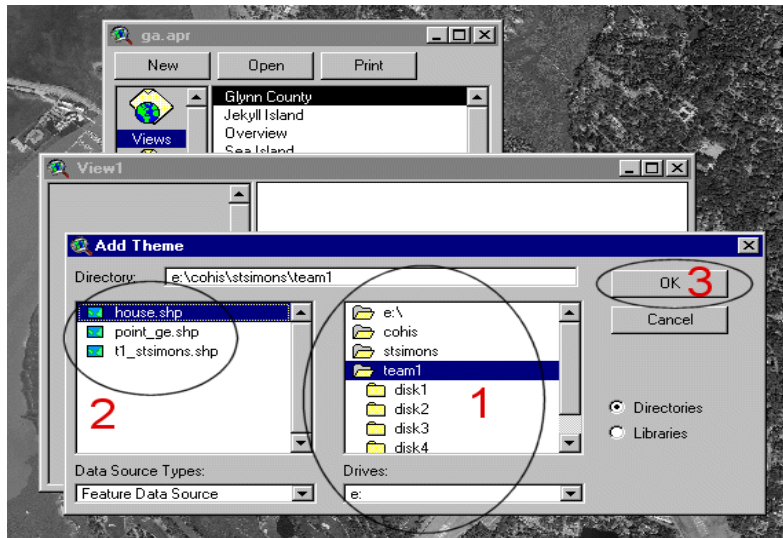
Then close the View Properties window by clicking on the X in the upper right hand corner.

The new view is now projected in the “State Plane - 1983, Georgia East” coordinate system. Next add the newly exported Shapefile(s) into the view as a New Theme.



1. From the View drop down menu choose “Add Theme.”

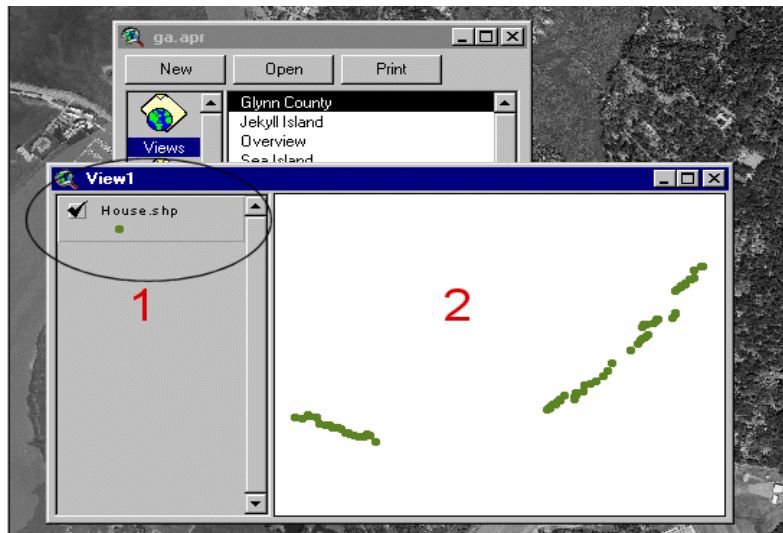
The Add Theme dialog box will open.



Add Theme dialog box.

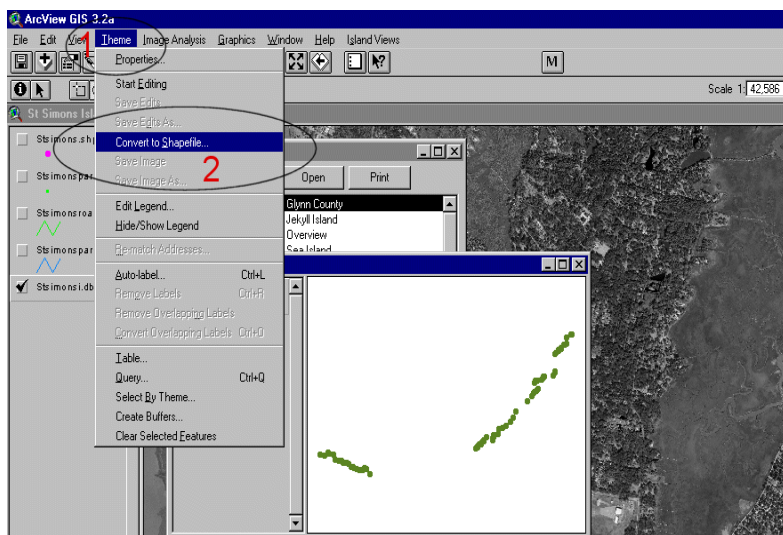
1. Choose the location where you exported your Shapefile.
2. Select the Shapefile that you want to add to the View.
3. Click “OK.”

This will add the New Theme to the blank View.



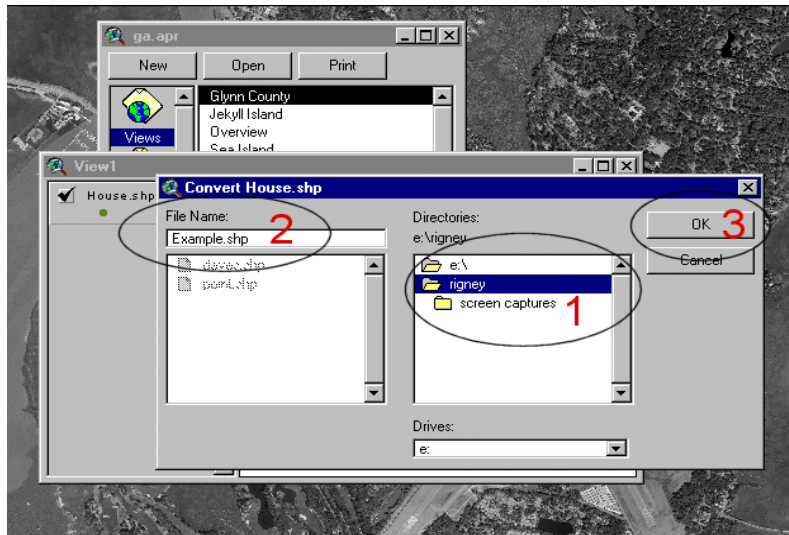
1. The New Theme is now displayed in the View.
2. The contents of the New Theme.

Make the New Theme active, then save the New Theme as a Shapefile.



1. Theme drop down menu.
2. Choose “Convert to Shapefile.”

The Convert to Shapefile dialog box will open.



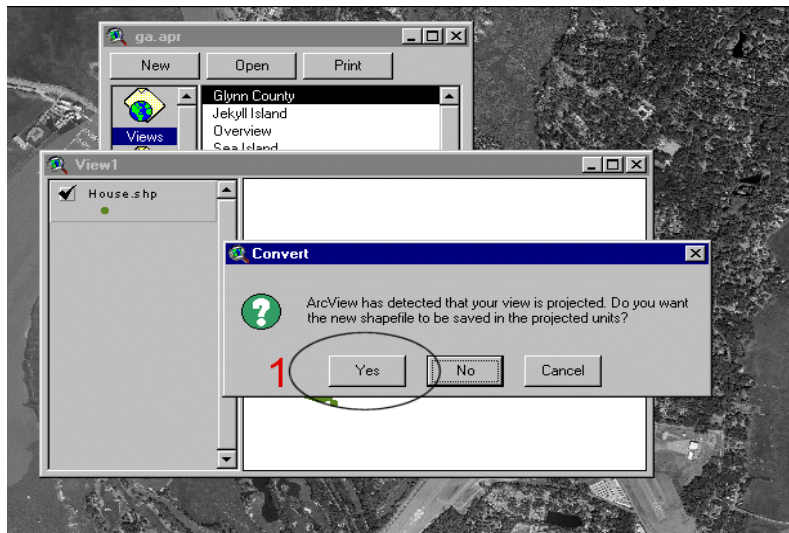
1. The location where you want your Shapefile saved.

2. Name of your newly created Shapefile.

3. Click “Ok.”

Note: You will want to give your Shapefile a unique name.

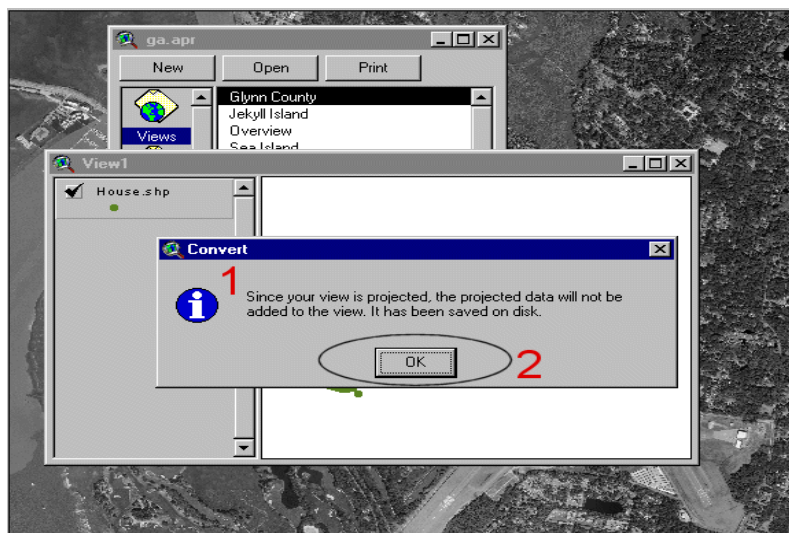
The following message will appear once you click “OK.”



This message informs you that the view was projected and do you want to save the new shapefile in the projected units.

1. Click “Yes.”

Another message box will appear.

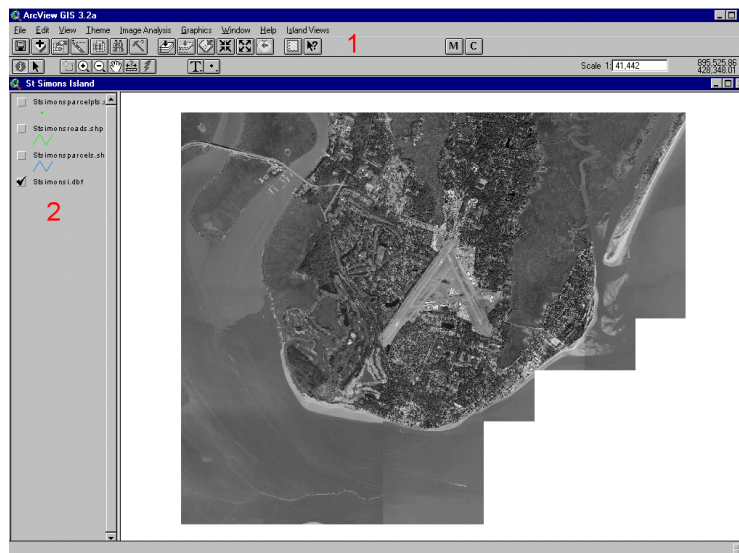


1. This message informs you that since your view was projected, the new shapefile will not be added to the view, but instead has been saved to disk.

2. Click “OK.”

Close the new View window and minimize the project widow.

Note: If you close the project window, ArcView will close.



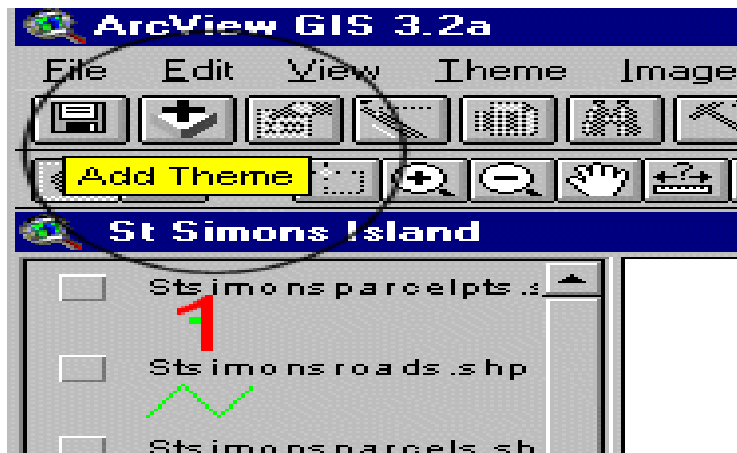
Now the Island view will be shown.

Turn off all the Themes except the .dbf Theme at the bottom.

1. GUI or Graphical User Interface which consist of Menus, Buttons and Tools.

2. The Table of Contents for this View. This contains the Themes associated with this View.

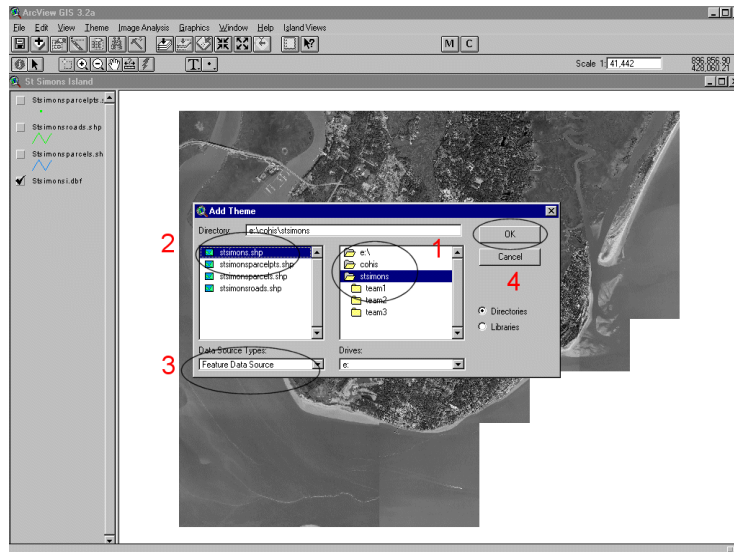
A Theme is a set of geographic features of the same type, along with their attributes.



Adding a Theme to your View.

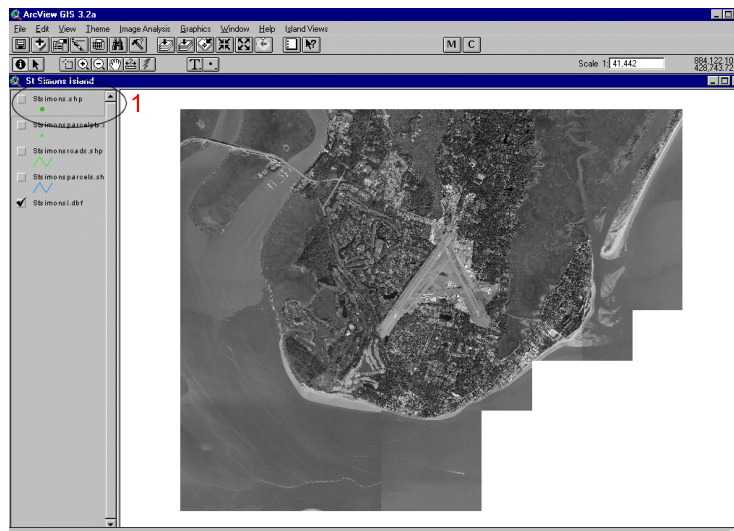
There are two ways that you can add a Theme, either select View then Add Theme, or by pressing the button with a plus sign on it.

1. Press the “Add Theme” button.



Add Theme dialog box.

1. Select the folder that contains the Shapefile you want to add.
2. Highlight the Shapefile.
3. Data Source Types. "Feature Data Source" should be selected. If you were loading Aerial-photography you would choose "Image Data Source."
4. Click "OK."



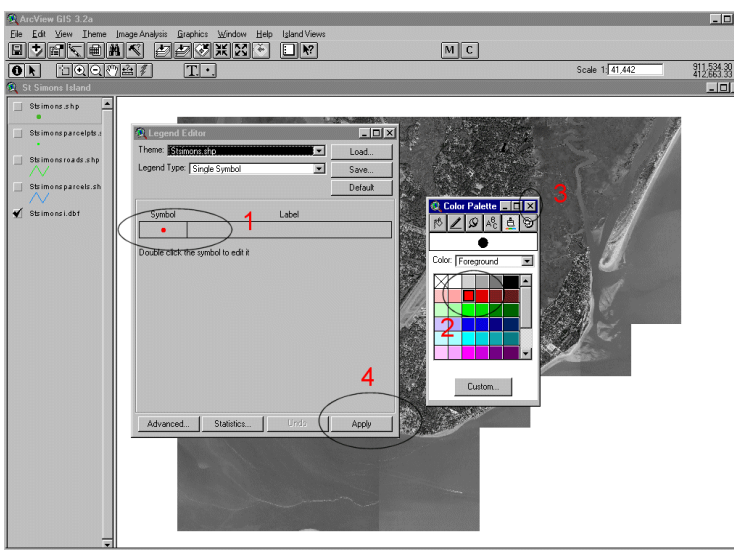
The Theme (Shapefile) is loaded and placed at the top of the Table of Contents.

1. *.shp

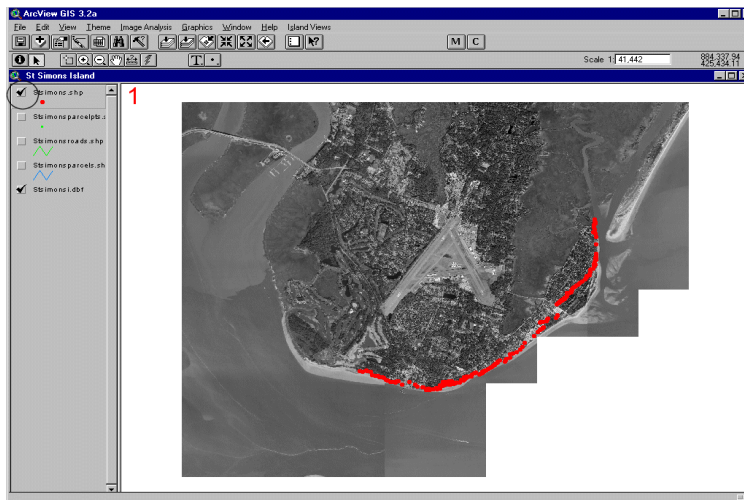
The Feature is given a color randomly.

Double "Click" on the new Theme.

The Legend Editor dialog box opens.



1. Double "Click" on symbol to change the color of the symbol that represents your Feature.
2. Select a new color.
3. Close the Color Palette window.
4. Click "Apply." Close the Legend Editor window. Your symbol will change to the selected color.



Turn on the Theme.

1. Turn on the Theme. Your Features will now be displayed.

At this point you can zoom in on a particular area. This allows you to clearly see the points where you collected data.



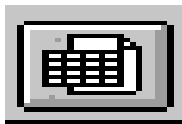
1. Press the “Magnifying Glass” with the plus sign.

Then either click on an area until it enlarges to the view you wish.

Another option for zooming in is to hold down the left mouse button and draw a box around the area.

Now that the area is enlarged you will “Hot Link” one of the digital photos of the structure.

The “Hot Link” feature allows you to link a feature in your view to a data source such as a text file, image or script. For the COHIS project we will be linking one of the digital photos taken of a particular structure to one of the data points collected for the structure. We will start this process by editing the “Theme Table” of the Theme which contains the data points.



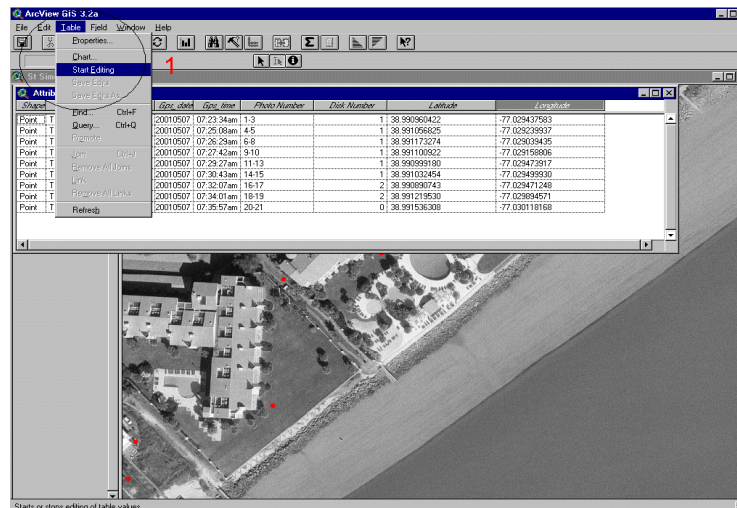
Press the Open Theme Table button on the tool bar.
This opens the Attributes Table for the selected Theme.

Shape	Comment	Gps_date	Gps_time	Photo Number	Disk Number	Latitude	Longitude
Point	TEST	20010507	07:23:34am	1-3	1	38.990960422	-77.029437583
Point	TEST2	20010507	07:25:08am	4-5	1	38.991056825	-77.029239937
Point	TEST3	20010507	07:26:29am	6-8	1	38.991173274	-77.029039435
Point	TEST4	20010507	07:27:42am	9-10	1	38.991100922	-77.029159806
Point	TEST5	20010507	07:29:27am	11-13	1	38.990999180	-77.029473917
Point	TEST6	20010507	07:30:43am	14-15	1	38.991032454	-77.029499930
Point	TEST7	20010507	07:32:07am	16-17	2	38.990890743	-77.029471248
Point	TEST 8	20010507	07:34:01am	18-19	2	38.991219530	-77.029894571
Point	TEST 9	20010507	07:35:57am	20-21	0	38.991536308	-77.030118168

The Attributes Table.

1. The Field names of the Attributes associated with this particular Theme.

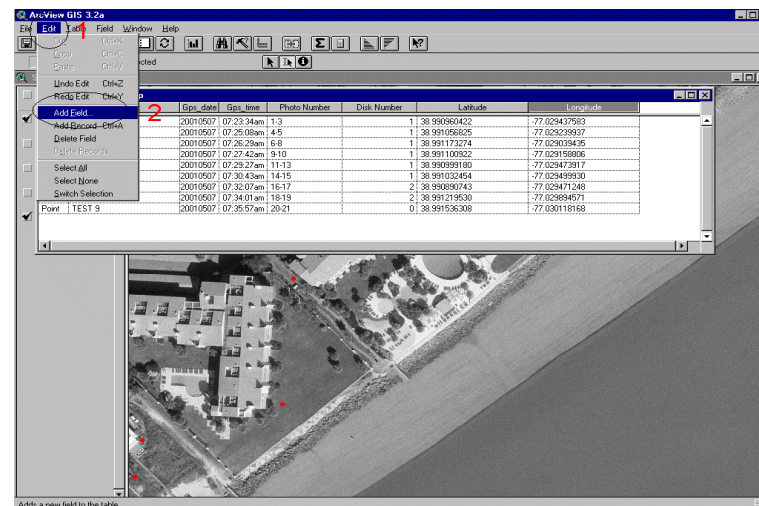
We will need to add a “New Field.” This new field will house the path to the digital photo we want to “Hot Link.” When the Attribute Table displays, the tool bar and the menus change. These new tools and menus are used when editing the Attribute Table.



From the menu bar.

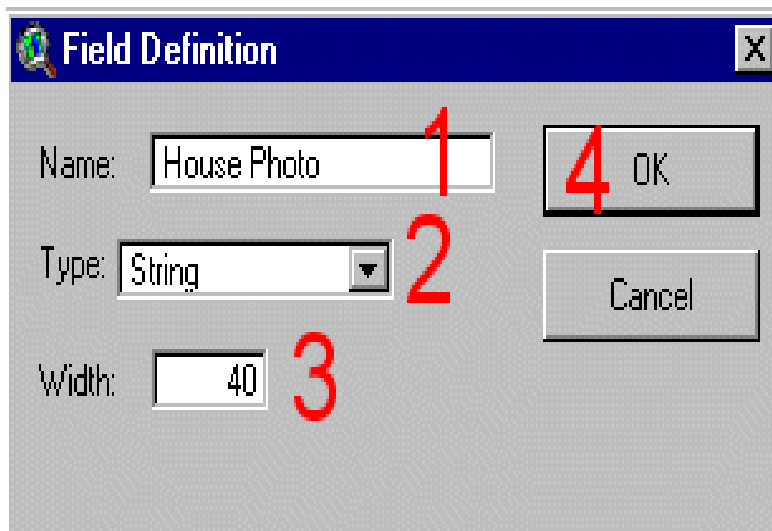
1. Choose “Table” then from the drop down menu choose “Start Editing.”

You will notice that the “Field Names” will become **non-italic**, this confirms that the table is editable.



1. Choose “Edit” from the menu bar.

2. Choose “Add Field.” The Field Definition dialog box opens.



Field Definition dialog box.

1. Enter the name of the field.
2. Select the type, this depends on what kind of information you want housed in this field.
3. Width (Should be large.)
4. Click “OK” to create the new field.

Gps_date	Gps_time	Photo Number	Disk Number	Latitude	Longitude	House Photo
20010507	07:23:34am	1-3	1	38.990960422	-77.029437583	
20010507	07:25:08am	4-5	1	38.991056825	-77.029239937	
20010507	07:26:29am	6-8	1	38.991173274	-77.029039435	
20010507	07:27:42am	9-10	1	38.991100922	-77.029158806	
20010507	07:29:27am	11-13	1	38.990999180	-77.029473917	
20010507	07:30:43am	14-15	1	38.991032454	-77.029499930	
20010507	07:32:07am	16-17	2	38.990890743	-77.029471248	
20010507	07:34:01am	18-19	2	38.991219530	-77.029894571	
20010507	07:35:57am	20-21	0	38.991536308	-77.030118168	

New Field.

1. House Photo Field. This field will contain the path to the directory that houses the digital photo. In most instances two points were collected per structure. We will only link one of the points to a photo. Close the Table.

Next you will want to find where the point is located within the attribute table.

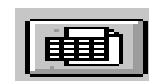
1. Click on the “Select Feature Tool” located to the left of the magnifying glass.

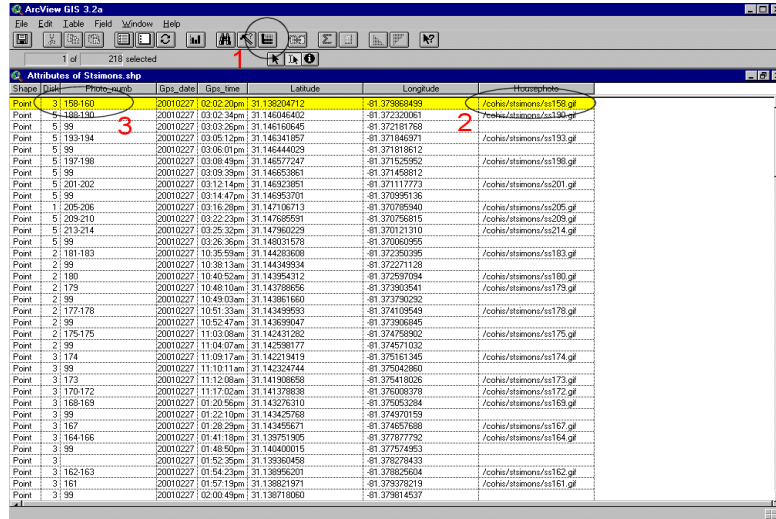


2. Click on the point you want to “Hot Link.”

The point you selected will now become highlighted on the screen and in the Attributes Table.

“Open the Theme Table”



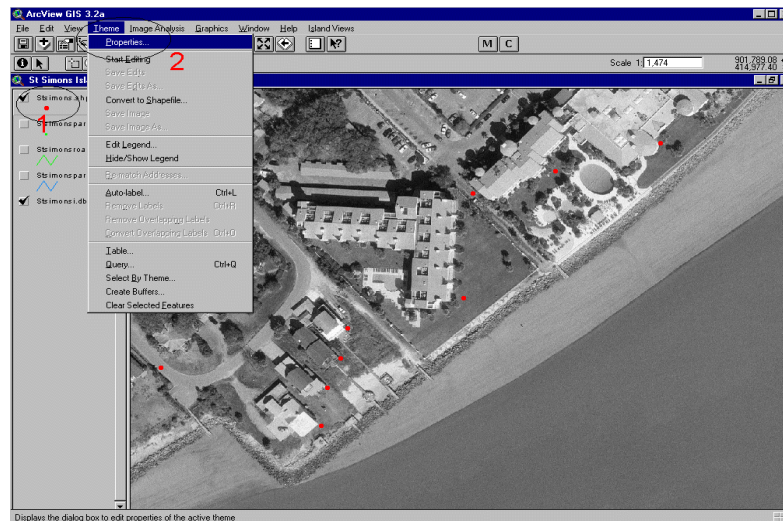


Point	Shape	Gps_date	Gps_time	Latitude	Longitude	Housephoto
Point 1	5	20010227	02:02:20pm	31.136204712	-81.378688499	/cohes/stsimons/s1156.gif
Point 2	5	20010227	03:02:34pm	31.146046402	-81.372320061	/cohes/stsimons/s1190.gif
Point 3	5	20010227	03:03:26pm	31.146160645	-81.372181769	
Point 4	5	20010227	03:05:12pm	31.146341687	-81.371948371	/cohes/stsimons/s1193.gif
Point 5	5	20010227	03:06:01pm	31.146444029	-81.371818612	
Point 6	5	20010227	03:08:49pm	31.146577247	-81.371525952	/cohes/stsimons/s1196.gif
Point 7	5	20010227	03:09:39pm	31.146653861	-81.371498812	
Point 8	5	20010227	03:12:14pm	31.146823861	-81.371117773	/cohes/stsimons/s2001.gif
Point 9	5	20010227	03:14:47pm	31.146953701	-81.37095136	
Point 10	5	20010227	03:16:28pm	31.147106713	-81.370769840	/cohes/stsimons/s2005.gif
Point 11	5	20010227	03:22:23pm	31.147685591	-81.370756615	/cohes/stsimons/s2009.gif
Point 12	5	20010227	03:26:30pm	31.147860229	-81.370731310	/cohes/stsimons/s2014.gif
Point 13	5	20010227	03:26:36pm	31.148031578	-81.370606955	
Point 14	2	20010227	10:35:59am	31.144263608	-81.372503095	/cohes/stsimons/s1603.gif
Point 15	2	20010227	10:38:13am	31.144348504	-81.372271126	
Point 16	2	20010227	10:40:52am	31.143954312	-81.372597094	/cohes/stsimons/s1180.gif
Point 17	2	20010227	10:48:10am	31.143788696	-81.373903541	/cohes/stsimons/s1179.gif
Point 18	2	20010227	10:51:33am	31.143466953	-81.374199549	/cohes/stsimons/s1178.gif
Point 19	2	20010227	10:52:47am	31.143699047	-81.373906845	
Point 20	2	20010227	11:03:08am	31.142431282	-81.374798902	/cohes/stsimons/s1175.gif
Point 21	2	20010227	11:04:07am	31.142586177	-81.374571032	
Point 22	3	20010227	11:09:17am	31.142219419	-81.375161345	/cohes/stsimons/s1174.gif
Point 23	3	20010227	11:10:11am	31.142224744	-81.375042860	
Point 24	3	20010227	11:12:08am	31.141930858	-81.375418025	/cohes/stsimons/s1173.gif
Point 25	3	20010227	11:17:02am	31.141728638	-81.376088379	/cohes/stsimons/s1172.gif
Point 26	3	20010227	01:20:56pm	31.143276310	-81.375053284	/cohes/stsimons/s1169.gif
Point 27	3	20010227	01:22:10pm	31.143425768	-81.374870159	
Point 28	3	20010227	01:26:28pm	31.143455671	-81.374657688	/cohes/stsimons/s1167.gif
Point 29	3	20010227	01:41:18pm	31.138751805	-81.377877782	/cohes/stsimons/s1164.gif
Point 30	3	20010227	01:48:50pm	31.140400015	-81.377574953	
Point 31	3	20010227	01:52:35pm	31.139360458	-81.376278433	
Point 32	3	20010227	01:54:23pm	31.138962301	-81.376265834	/cohes/stsimons/s1162.gif
Point 33	3	20010227	01:57:19pm	31.138821971	-81.375378219	
Point 34	3	20010227	02:00:49pm	31.138718060	-81.375814537	/cohes/stsimons/s1161.gif

1. By pressing the “Promote” button, the selected feature is promoted to the top of the table.

2. Enter the Path to the folder where your photos are stored and the photo’s file name. This has to be done for every feature.

3. List the photos associated with this Feature, this will come in handy when creating your Layout in the future.



Next you will tell ArcView that the “Housephoto” field contains the “Hot Link” information.

1. Make sure the “Theme” which contains the point you want to “Hot Link” is active.

2. From the Theme Menu drop down bar select “Properties.”

1. Scroll down and select “Hot Link.”

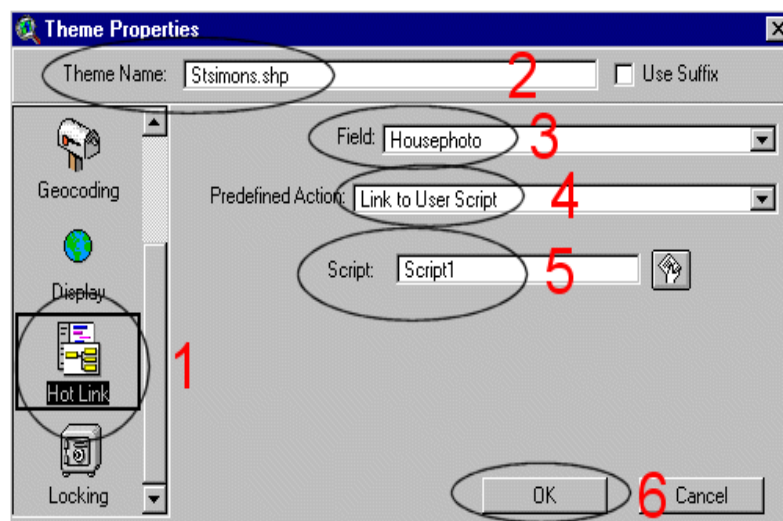
2. The name of the Theme.

3. The field which contains the location of the photo.

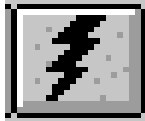
4. Action to be taken.

5. Script name (Script1.)

6. Click “OK.”

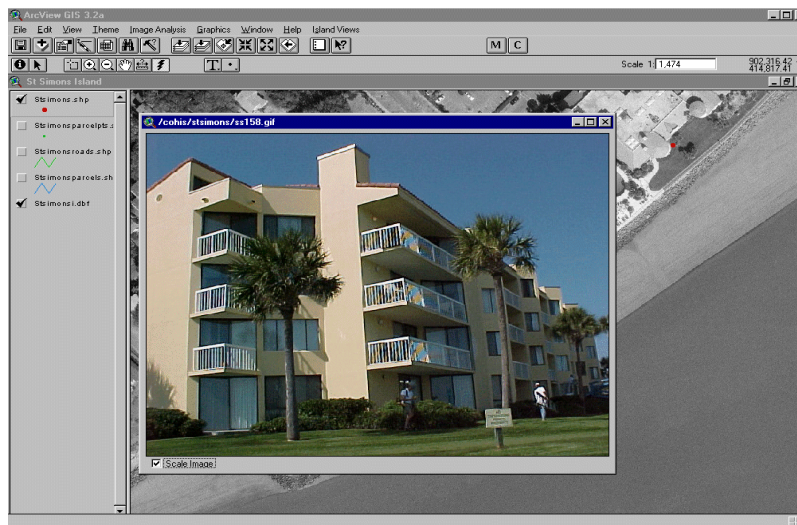


Note: For the COHIS project, a Script was written (Script1) to determine the size of the window which displays the photo when the user selects the feature with the “Hot Link” tool. Now you are ready to test the “Hot Link.”



Hot Link Tool.

1. Make sure the Theme is Active.
2. Select the “Hot Link” tool.
3. Select the point with the tip of the hot link tool.



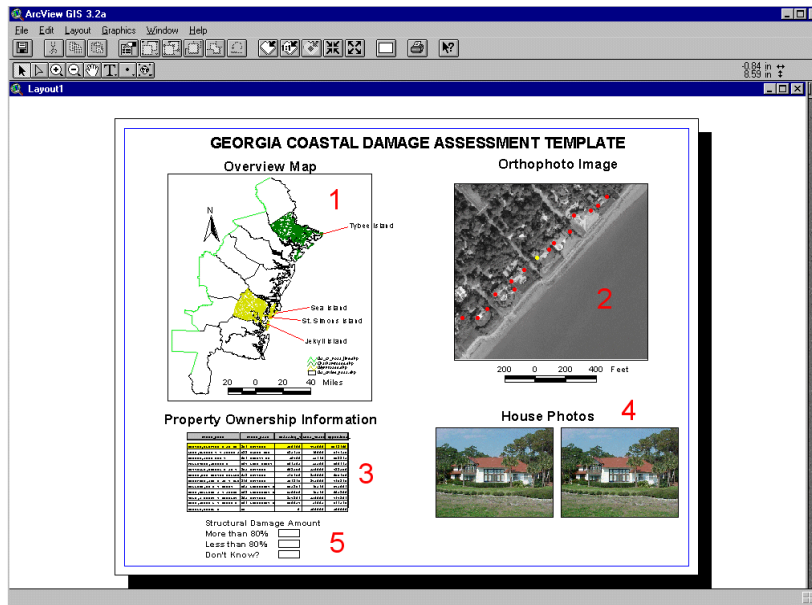
A view containing the photo of the structure opens.

It is good practice to test each “Hot Link” as you create them. This ensures that the path or other information was entered correctly.

To close the photo, press the X in the upper right hand corner.

Many photos will be taken during each phase of the project, it is important to come up with a naming convention which makes each photo unique. The photos should be numbered consecutively from the start of the project.

Another useful utility that ArcView has is the map layout. The map layout is linked to specific documents within the ArcView COHIS project. The map layout allows you to print a hard copy map that can be carried into the field.

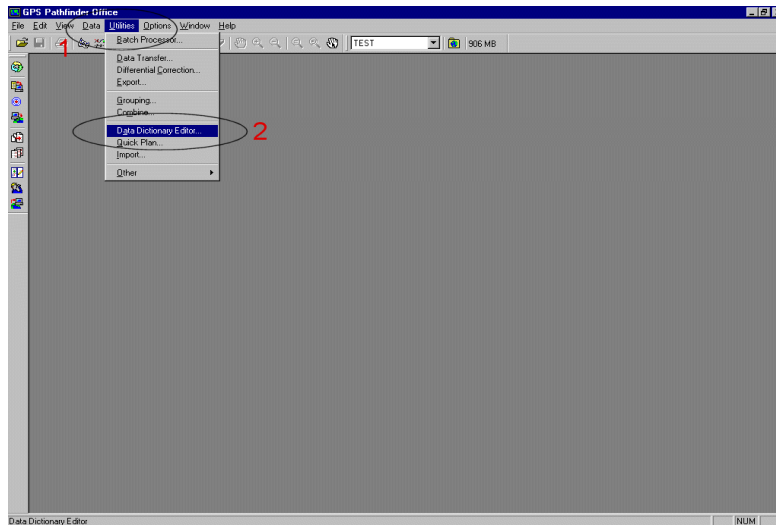


Example of the Map Layout.

1. Georgia Coastal Overview Map.
2. Orthophoto.
3. Property Ownership Info.
4. House Photos.
5. Structural Damage Amount check boxes.

This section will cover the post-storm Data Dictionary, use of the map layout, collecting data, assessing damage amount to structures, correcting the data and importing the data into the COHIS project.

The post-storm Data Dictionary should be created and placed on the GeoExplorer 3 in advance of the storm season, this will insure that the unit is ready for use in the event of a storm.

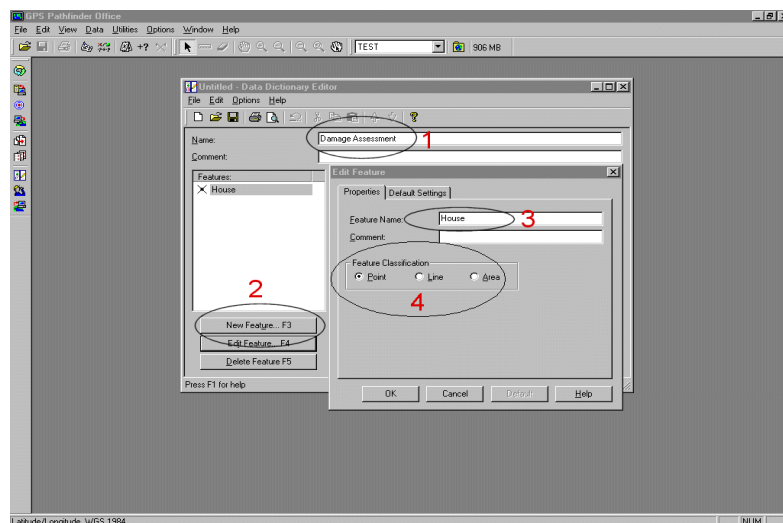


Post-Storm Data Dictionary.

Open GPS Pathfinder Office.

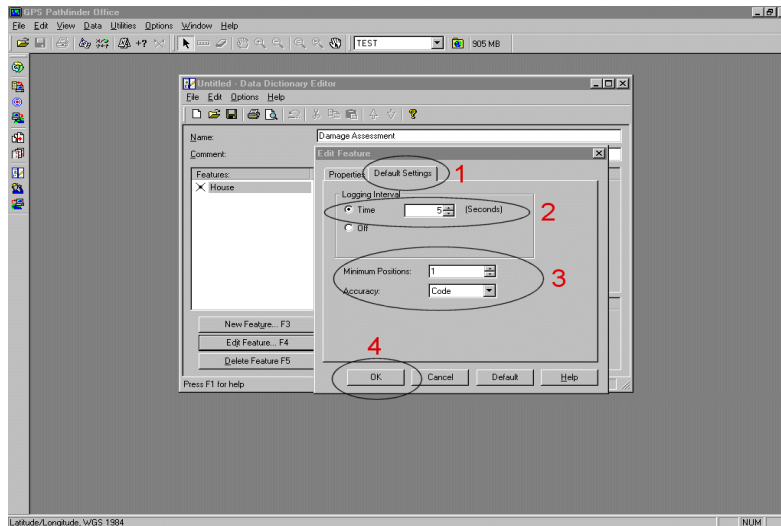
1. Utilities Menu.
2. Choose “Data Dictionary Editor.”

The Data Dictionary Editor dialog box opens.



1. Name your new Data Dictionary.
2. Select “New Feature.”
3. Enter Feature Name under the “Properties Tab.”
4. Feature Classification “Point.”

This Data Dictionary should be given an unique name so it is distinguishable from any of your normal working Data Dictionaries. For example, Damage Assessment or Post-Storm.

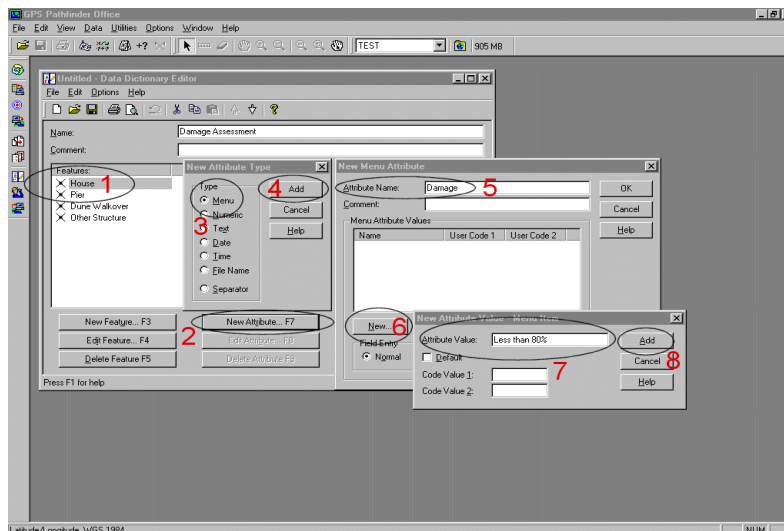


1. Default Settings Tab.
2. Logging Interval Time, 5 seconds is recommended.
3. Minimum Positions, 1. Accuracy, Code.
4. Click “Ok.”

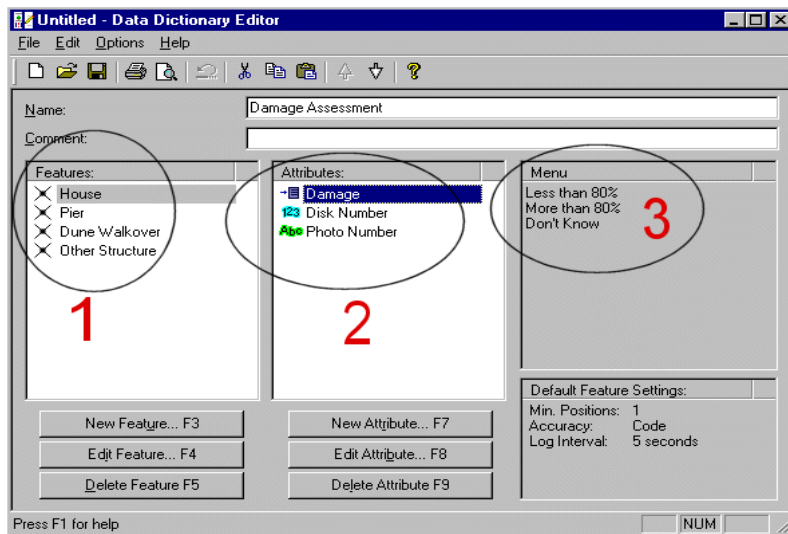
This process will be done for all Features in the Post-Storm Data Dictionary.

Next enter the Attributes to be associated with each Feature. The Attributes will prompt the user to input information at each Feature. The procedure for adding the “Disk Number” and “Photo Number” Attributes were covered previously in the manual. For the Post-Storm Data Dictionary there will be an additional attribute.

The “Damage Attribute.”

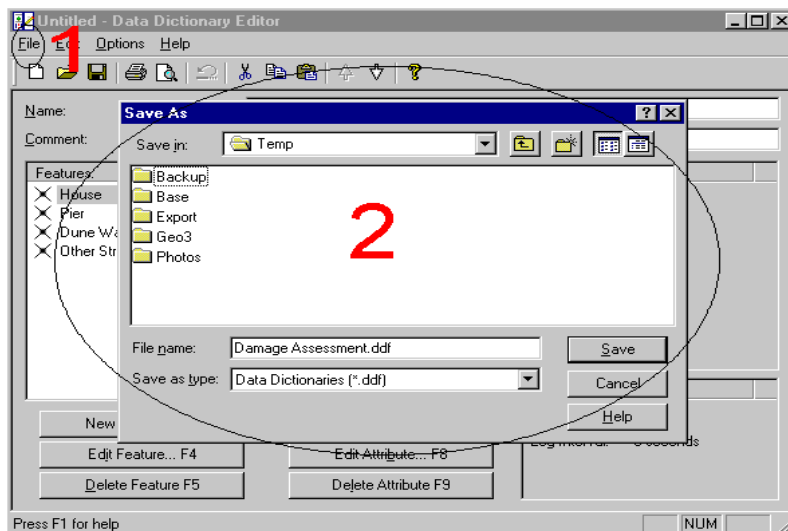


1. Highlight a Feature.
2. Select “New Attribute.”
3. Select “Menu” for Type.
4. Click “Add.”
5. Attribute Name “Damage.”
6. Select “New.”
7. **Attribute Value.** Enter 3 recommended Attributes (which are subject to change,) (1) Less Than 80%, (2) More Than 80%, and (3) Do Not Know.
8. Click “Add.”



1. List of Features.
2. List of the Features Attributes.
3. List of choices within the “Damage” Attribute.

Once you have created the “Attributes” for one Feature, you can **“Copy and Paste”** them to all of the other Features.



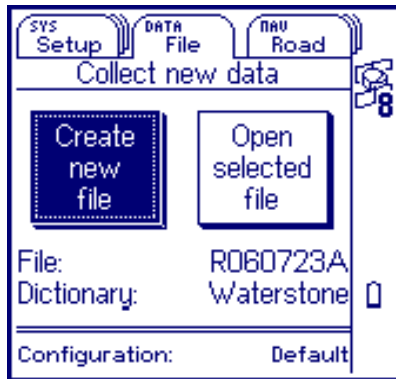
Save your Data Dictionary.

1. Select “File” then “Save” from the menu bar.
2. Select the folder where you want your Data Dictionary saved to. Press the “Save” button.

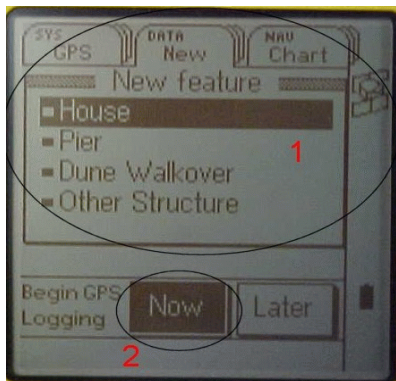
Now that you have created the Data Dictionary that will be used for your Damage Assessments, you can either transfer it to the GeoExplorer 3 or store it on the computer until a later date.

The procedure for transferring the Data Dictionary to the GeoExplorer 3 is the same as previously described. (See Pages 7-8.)

Data collecting will be performed as previously described (Pages 9-12.) There will be one additional prompt for the user to enter while collecting data, the “Damage” attribute. The following will illustrate how to use the attribute.

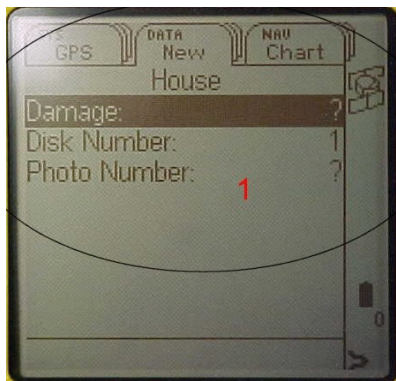


As soon as the GeoExplorer 3 finishes booting up, press the Data button and the screen to the left will display. Highlight “Data Dictionary” by using the down cursor key and press enter. A list of dictionaries will be displayed, select the dictionary created for “Damage Assessment” and press enter. The chosen dictionary’s name will now appear on the screen. If not highlighted already, choose “Create new file” and press enter. The GeoExplorer 3 will display the “New Feature” screen.



New feature.

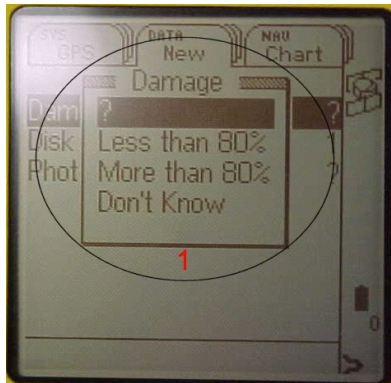
1. A list of the Features contained in the Data Dictionary. Select the Feature you want to collect data on by highlighting the Feature. You can scroll through the list by using the up or down cursor key.
2. The GeoExplorer 3 is ready to begin data collecting. After choosing your Feature type press enter.



Attributes of the “House” Feature.

1. A list of all Attributes associated with the “House” Feature. Press enter.

Information will be entered for all of the Attributes, for this example, only the “Damage” attribute will be shown.



The Damage Attribute.

1. After selecting the “Damage” attribute, a menu displaying a list of choices will be shown. Select the appropriate statement by highlighting it, then pressing enter. The next attribute will become highlighted. Enter the information requested for each of the Attributes.

When the desired number of Logging Intervals are collected, close the Feature.

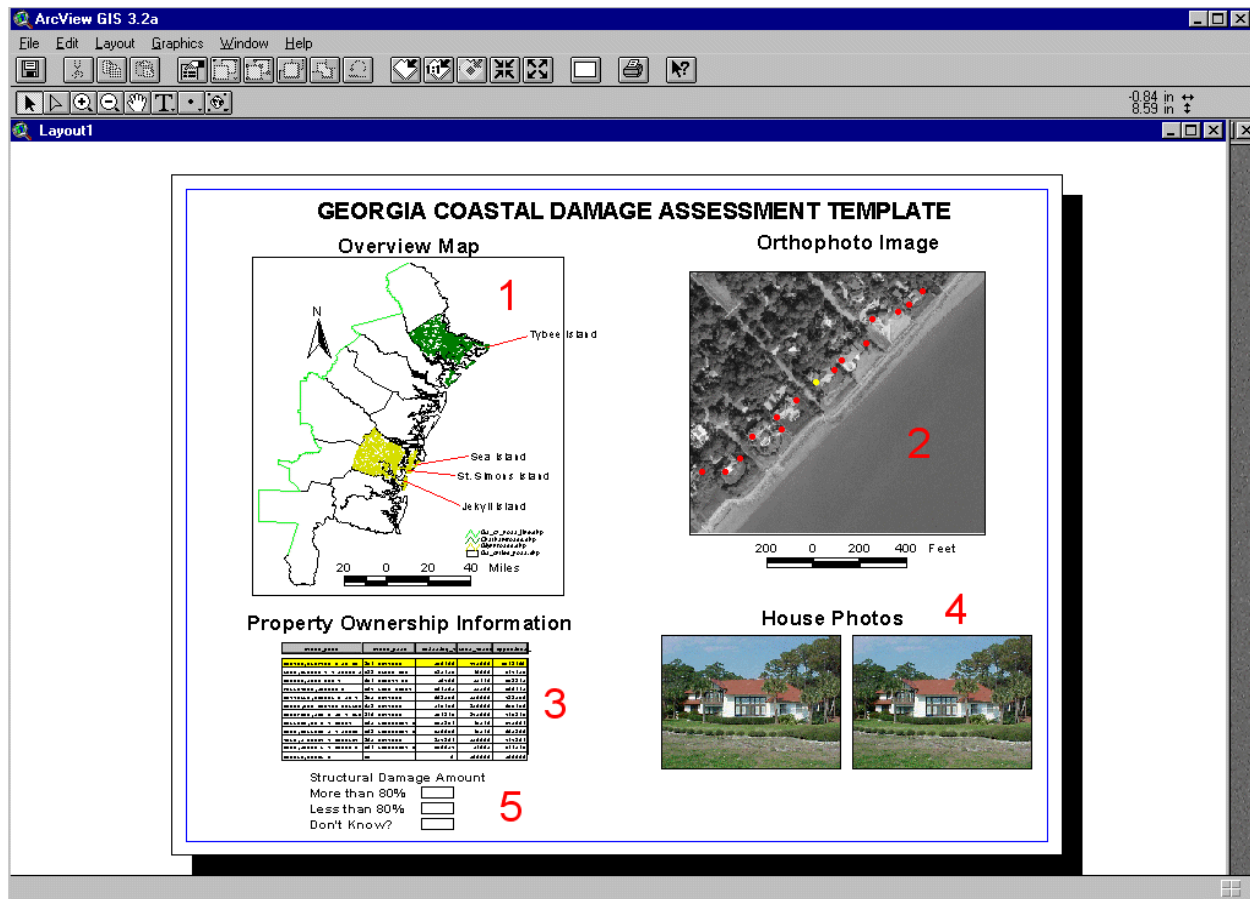
After completing the Post-Storm data collection, you will need to do the following.

1. Transfer your data from the GeoExplorer 3 to a computer. (See Pages 13-15.)
2. Correct your data using CORS. (See Pages 16-21.)
3. Export your data as a Shapefile. (See Pages 22-24.)
4. Load the newly converted Shapefile into the project. (See Pages 25-38.)

Note: For the Post-Storm data, keep as a separate Theme in the View that the data is associated with. This will allow you to turn the Theme on and off, keeping the Pre and Post-Storm data sets separate for evaluation purposes.

The “COASTAL DAMAGE ASSESSMENT TEMPLATE” is a printable, hard copy map (Layout) that can be carried out into the field. The “COASTAL DAMAGE ASSESSMENT TEMPLATE” contains links to: (1) Digital Photos of Structures, (2) Parcel Ownership Information, (3) Coastal Overview Map, (4) Orthrophotography. Although there is only one Layout, information for all of the areas within the COHIS project can be displayed. Each document displayed on the Layout has its own box or frame. These frames will have to be edited to reflect which View the user is working in. By keeping a document active in the View, the Layout becomes dynamic, as you change information in a view, that information is also changed within the view frame of the Layout.

Example of the “GEORGIA COASTAL DAMAGE ASSESSMENT TEMPLATE.”



1. The Georgia Coastal Overview map.
2. The Orthophoto Image (View) that is active.
3. The Parcel Ownership information associated with the view (2) that is being displayed
4. The digital photos associated with the house selected on the View.
5. Structural Damage Amount check list.